

The Technology Review

VOL. XIII

JANUARY, 1911

No. 1

A LARGER CONTRIBUTION FROM THE STATE

Why it should be given to the Massachusetts Institute of Technology—An Argument for its Increase—The Importance of the Institute to the State and to the Nation

SUMMARY.

(1) The Massachusetts Institute of Technology is the most famous school of its kind in the country and one of the most famous in the world. It has established and maintained the highest standards of efficiency and excellence. It would be a calamity to the people of the state should these standards not be maintained.

(2) They cannot be maintained unless it receives \$100,000 per annum from the state or elsewhere.

(3) It needs this increased income because the cost of maintaining leadership in this field of education has greatly increased. In the sixteen years that have elapsed since the state first made its annual contribution of \$25,000, the annual expenditure has increased by \$268,547. This increase has been due in part to the natural growth of the Institute itself, in part to the general rise in prices, but more to the increasing recognition by the commercial world of the value of technically trained men, and to the increase in the number, and the enormous increase in the endowments, of similar institutions elsewhere. These changed conditions inevitably affect the salaries that must be paid for competent instructors, and swell all other items in the expenditure.

(4) The Institute is justified in asking for this support from the state because:

(a) It is, and always has been, a state institution, founded by the state and bearing the state's name. The state gave it the land

technology review

Published by MIT

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on which its first buildings were erected, has assisted it financially ever since, and has official representatives on its governing body.

(b) Owing to the excess of expenditure on the education of its students over the fees received from them, it contributes *directly* about \$200,000 per annum towards the education of young men *from the state of Massachusetts*.

(c) Similar institutions, doing no more important work, are receiving far more support from the state. In this state the value of the Agricultural College to Massachusetts was recognized last year by a grant of \$210,425, and for five years this college has received on the average an annual appropriation of \$172,510 — *exclusive* of its income from the Technical Education Fund, from which it receives twice as much as the Institute. The number of regular students *from the state of Massachusetts* at the Institute is nearly three times as many as at the Agricultural College. In other states the appropriations have been no less liberal. From the latest report (1910) of the United States Commissioner of Education it appears that the following state grants were made during the year. (The numbers in brackets indicate the increase of the grants over those recorded in the report of the previous year.)

California to its State University \$693,201 (+ \$34,815).

Illinois \$1,265,845 (+ \$219,845) to the University of Illinois.

Iowa \$445,617 (+ \$165,617) to the College of Agriculture and Mechanic Arts besides \$394,532 (— \$43,635) to the University.

Michigan \$772,444 (+ \$152,579) to the University and \$326,000 (+ \$16,200) to the Colleges of Agriculture and Mines.

Minnesota \$1,030,536 (+ \$1,124) to the University.

New York \$193,922 (— \$73,205) to Cornell.

Ohio \$555,187 (+ \$21,523) to the University.

Texas \$193,585 (+ \$16,300) to its College of Agriculture and Mechanic Arts.

Wisconsin \$1,147,988 (+ \$320,455) to the University.

(d) It has done pioneer work in shaping the educational policy of the country and has made notable contributions towards the advancement of science and the development of the industrial and commercial prosperity of the state and nation. It has done this although its numbers were at first so small that there are only about 650 living graduates who took their degrees more than

twenty years ago. Today there are over 1,500 students in its courses, and great things may be expected from the efficient training of such numbers during the course of the next ten years. The economic efficiency and the further development of the state's manufacturing and transportation industries will depend primarily on the extent to which scientific methods and improvements are introduced.

(e) It is the heart of the state's system of industrial education, a system that will be vitally affected by the standards and ideals that the Institute maintains. It has already given directors to such institutions as the Textile Schools, the Franklin Union, the Wentworth Institute, and the Lowell School for Industrial Foremen. It must continue to supply men competent to direct the growth of industrial education, a growth that is expected to be unusually rapid within the next generation. The strength of the Institute is vital to the success of this movement, for if the heart be weak the condition of the whole system is precarious.

(f) The Commonwealth of Massachusetts, in accordance with its great traditions and recognized intellectual leadership, is bound to provide for its citizens the best system of higher education that is practicable. On account of the special circumstances of the state, technical education is absolutely vital to its continued prosperity, and especially in this field nothing but the best can be good enough for Massachusetts. Without the aid here asked for the Institute cannot possibly maintain its leadership.

ARGUMENT.

The Massachusetts Institute of Technology was incorporated by an Act of the Legislature of Massachusetts "for the purpose of aiding by suitable means the advancement, development and practical application of science in connection with arts, agriculture, manufacture and commerce." This Act was approved by Governor Andrew on April 10, 1861. At this period there were many forces at work to impress on farseeing men the necessity of radical changes in education in order that the country might profit as it should by the discoveries of science and by the application of its method and its spirit to the great practical problems of the day. Some such school as the Institute of Technology would inevitably have been founded somewhere about half a century ago. The fact that it was founded in Massachusetts was due

mainly to the foresight of Rogers who planned it, secured its foundation at the hands of the Commonwealth, and afterwards as its first president controlled its upbuilding with consummate wisdom. He was not a Massachusetts man, nor even a New Englander; when the Institute was founded he had spent upwards of forty years of his life in his native state — Virginia. As a scientist devoted to the cause of education he had become convinced that there was urgent need for an educational institution of a different type from any then existing in this country. He made a careful survey of the field and deliberately selected Massachusetts as the strategic point best suited for the new venture. He was drawn to this state because of the character of its people, their high ideals in educational matters, their insistence on the best that is available as being alone good enough for Massachusetts. He believed that here more easily than anywhere else it would be possible to set up and to maintain the very highest standards of scientific education, and the whole success of the school — as he conceived it — depended on the maintenance of the *highest* standards. In all respects save one Rogers' choice of Massachusetts has been fully justified. The Institute has trained a number of men who are now in the very front rank of science, men who have extended far the boundaries of knowledge and thereby gained a world-wide fame. In addition to this its former students are to be found in positions of power and responsibility in every state of the Union, engaged in the work of developing mines, opening up the country by means of railroads, applying scientific methods to the great problems of transportation, power production and distribution, advancing chemical industries, conserving the public health, and contributing in countless other ways to the increase of the nation's wealth. These men have not come exclusively from any particular class, rich or poor, but the greater number are men whose capital is their character and their power; they have been drawn from a source to which the state naturally looks for new energy, new enthusiasm, and the power to cope successfully with new conditions.

However, it is not merely by its direct influence on its students that the success of the Institute and its value to the state are to be gauged. Its indirect influence has been almost equally notable. It has done pioneer work in education in the breaking down of old traditions and the establishment of new methods. It has

given strength and dignity to the "practical" and "laboratory" method and proved conclusively its value in dealing effectively with large bodies of men. It was "the first school to equip a mining and metallurgical laboratory for the instruction of students by actual treatment of ores in large quantities; the first to establish a laboratory for teaching the nature and use of steam, and a laboratory for testing the strength of the materials of construction in commercial sizes; and the first in America to establish a department of architecture. It was also the first in this country to set up distinct and separate courses of study in electrical engineering, in sanitary engineering, in chemical engineering, and in naval architecture." In Massachusetts we are, perhaps, too near the Institute to have a proper perspective of its importance, but there is no lack of impartial testimony to guide us to the truth. Sir William Mather after a study of the leading schools of the kind in the world held it up as the best model for his own country. Speaking in London of the Massachusetts Institute of Technology he said, "The spirit and energy of the students, their conspicuous practical knowledge, the thoroughness with which their scientific knowledge is tested in the course of instruction, and the power of adaptation and resource they possess on entering workshops and manufactories, railroads, or mines, public works and constructive engineering — all these fruits of the training of this Institute are, so far as I have seen, not equalled on the Continent. I think these are the qualities we need in England."⁷ For years the Institute has been visited by distinguished bands of engineers and educators from various parts of the world, and reports to governments or societies in England, France, Germany, Switzerland, Russia, Spain and Japan set forth in flattering terms the high esteem in which the Institute is held abroad. At home it has been subjected to the sincerest form of flattery — imitation — its methods being copied in almost every similar institution throughout the country. Its graduates are eagerly sought for everywhere and the prestige of the Institute is of the highest order.

FINANCIAL HANDICAP OF AN ENGINEERING SCHOOL

To this extent the justification of Rogers' choice has been complete. Only in one matter has there been disappointment, and that is in the financial support that the Institute has obtained.

It is true that the state has helped substantially and that there have been liberal private benefactors, the total gifts from private sources having amounted to over five million dollars. Especially, however, within recent years there has been a failure to appreciate the high cost that education of this type demands *if it is to be the best*. Not only does it require much more costly machinery, but more teachers and more highly paid teachers than the older forms of education. The laboratory method, which is the very essence of education of this type, cannot be applied successfully where a teacher has to supervise the work of a large group of students. To increase the difficulty the Institute is in a sense hurt financially by its own success. The value of technically trained men is now recognized in the commercial world, and their services must be more highly paid for when they are sought as teachers than was the case formerly. In addition to this the Institute is no longer alone or nearly alone in the field of technical education. It has to compete for its teachers not only with the world of business, but with numerous educational institutions that have far greater financial resources, many of them being supported by states fully alive to the wisdom of dealing with such institutions in a thoroughly liberal spirit. All these special forces tend to increase the expenses of the Institute, and work in conjunction with the general pressure that is increasing the cost of living everywhere and thereby inevitably increasing the price of labor, intellectual as well as manual. Recently, without adding to the number of its instructors, the Institute in a single year has had to add \$23,000 to the salaries it pays, and even now is in constant danger of losing some of its best teachers owing to the greater financial attractions that can be held out elsewhere. The annual payment for salaries is \$72,720 greater than it was five years ago, although within that period there has been very slight change in the number of instructors. Since the grant of \$25,000 per annum was first made by the state there has been an increase of \$171,443 in salaries and of \$268,547 in the total annual expenditure required to maintain the Institute in the front rank. The increase in the excess of expenditure over receipts from fees has been \$148,788. Unless considerable financial assistance comes from some source the present outlook is serious. Of recent years, in spite of the most rigid economy, there has been an excess of expenditure over income amounting on the average to more than

\$30,000 per annum. The grant of \$25,000 that has been given by the Commonwealth of Massachusetts for the last sixteen years expires this year; and at the same time there comes to an end an income of over \$40,000 per annum guaranteed five years ago by certain friends of the Institute. It thus appears that at least \$100,000 per annum will be required merely to maintain the Institute at its present level, without providing for any advances, although new developments in various directions are urgently called for. Were it less hampered financially it might render great service to the state by establishing a number of testing and research laboratories, like its present Research Laboratory of Applied Chemistry, to which manufacturers might, under proper regulations, bring their products to be tested and their problems to be investigated; it might extend such instruction as is now given by its teaching staff in the Lowell School for Industrial Foremen, in which evening courses are carried on for the benefit of working men; it might organize, in various cities in Massachusetts, scientific instruction relating to important specific industries, thereby greatly extending the scope of its influence and of its usefulness. However, the extension of its activities in any such directions, however desirable, cannot be undertaken until its present work has been adequately provided for.

It might be suggested that the Institute should raise its fees, but it should be borne in mind that these fees are now \$250 per annum, as high as those of any other similar institution in the country, and higher than all save one. The usual fee in the engineering schools of Eastern universities — such as Yale, Princeton, and Cornell — is \$150, while throughout the West and Middle West the fees are generally little more than nominal, \$30 or less.

Under such circumstances it is natural for the Massachusetts Institute of Technology to look to the state for further assistance. It has never been a private institution, nor borne any other name than that which it received from the state on its foundation at the hands of the state — the *Massachusetts* Institute of Technology. Its connection with the state is recognized, amongst other ways, by the presence on its governing body of three state officials — the governor and the chief justice of the Commonwealth and the commissioner of education. The state gave it the land on which its first buildings were erected and since then has contributed

half a million dollars towards its general expenses. The state has made it one of the two beneficiaries of the income from the Technical Education Fund established by the United States government. In addition to this the state has shown its faith in the Institute by encouraging young men from Massachusetts to go there with the aid of state scholarships. Unfortunately, the establishment of these scholarships has not lightened the financial load on the Institute. On the contrary it has increased the burden. At the time when the state scholarships were founded the tuition fees at the Institute were \$200 per annum and it was on this basis that the sum paid by the state for each scholar was determined. Since then the fees have been raised to \$250, so that the Institute gets \$50 less from a state scholar than from any other student. Thus the forty state scholarships cost the Institute \$2,000 per annum. This sum is, however, insignificant in comparison with the total *direct* financial contribution that the Institute makes annually towards the education of the youth of Massachusetts. The Institute makes every year a report to the legislature in which is set forth a complete statement of its financial condition. An examination of these reports in recent years will show, by the simple process of dividing the total current expenditure by the number of students, that the cost for tuition and maintenance is \$390 per student. To this must be added at least \$80 per student to cover the interest on capital invested in land, buildings and equipment (*in excess* of what has been contributed by the state) and to make a reasonable allowance for depreciation. Thus the total cost to the Institute is at least \$470 per student. Last year 852 students came to the Institute *from the state of Massachusetts*. Eighty of these were state scholars paying \$125 per year on what is known as a "half scholarship basis," so that the cost of each to the Institute in excess of fees received (\$125 from the scholar and \$100 from the state) was \$245, or a total of \$19,600 for all the scholars. Each of the others cost the Institute \$220, so that the total expenditure on their behalf was \$169,840. It thus appears that the Institute contributed directly a sum of \$189,440 last year — a year that was in no respect abnormal — towards the education of young men *from this state*. In addition to this it paid \$26,875 towards meeting the tuition fees of students (outside of the scholarships provided by the state). A large part of this went to students from Massachusetts, although the

grants were not restricted to them as in the case of the state scholarships. If the state should make the annual grant of \$100,000 that is asked for, it would contribute half what the Institute is now contributing towards the education of young men from Massachusetts.

What is the true principle that should guide legislatures in determining the amount of their contributions to educational institutions is, of course, a matter that gives room for difference of opinion. It may be well, however, to estimate the support that the Institute should receive from the state on the basis of various principles that have been adopted elsewhere.

The policy of most of the progressive Western states is to give practically free tuition to all students that come from within the state. On this basis the Massachusetts Institute of Technology should receive over \$400,000 per annum from the state in order to maintain its courses at their present level. Where a less liberal policy is adopted the state, instead of bearing the whole cost, pays a certain proportion of the tuition fees to encourage students, or a certain proportion of the income from private benefactions to encourage the benefactors, or a certain proportion of the income from productive funds to encourage the trustees in a prudent use of the benefactions that they receive. The proportion supplied by the state varies enormously, as may be learned from a study of the statistics published annually by the United States commissioner of education. There the facts are set forth with regard to all the institutions of higher learning in the Union — between 400 and 500 universities, colleges, and technological schools. Taking the total for all these institutions during the last five years for which published statistics are available it appears that the average annual income is, in round numbers, ten million dollars from productive funds, seventeen million from private benefactions, thirteen million from tuition fees, and thirteen million from the state. If the Institute were to receive the *average* treatment at the hands of the state, then on the basis of productive funds it should get \$117,000 annually, on the basis of private benefactions \$136,000 annually, and on the basis of tuition fees \$325,000 annually.

However, we are not left without clearer guidance as to what should be the policy of the Commonwealth of Massachusetts. The legislature in this state has by its own acts indicated in the

most practical way its attitude toward higher technical education. It has done this by the financial support that it has afforded to a sister institution engaged like the Institute of Technology in work of vital importance to the welfare of the state. Last year it appropriated \$100,925 for general maintenance and \$109,500 for buildings to the Massachusetts Agricultural College. In the last five years its annual appropriations towards this agricultural college have *averaged* \$82,970 for maintenance and \$89,540 for buildings, making a total annual appropriation of \$172,510 — *exclusive* of what it has granted to the institution out of the Technical Education Fund, from which the Agricultural College gets twice as much as the Institute of Technology. Last year the number of regular students who came *from the state of Massachusetts* to work towards a degree was 293 at the Agricultural College and 852 at the Institute of Technology, nearly three times as many at the latter as at the former. If the appropriations to the two institutions had been proportioned to the number of Massachusetts students at each, the Institute of Technology should have received more than \$500,000 per annum.

The contributions that have been made by the alumni of the Institute towards the advancement of science and the development of the industrial and commercial prosperity of the state and nation have already been very great. The mark that the Institute has made in this way and the distinct impress of its methods on the educational policy, not only of this country but of the world, are all the more striking when regard is had to the fact that the numbers at the Institute were very small until recent years. The first graduating class in 1868 contained only fourteen members, and there are only about 650 living graduates who took their degrees more than twenty years ago. The rapid expansion of the Institute has been so recent that more than half its graduates have gone forth within the last ten years. Since the influence of the small band of early alumni has been so marked, it is reasonable to expect much greater things from the large numbers of today and of tomorrow. During the next ten years, allowing for normal growth, at least 5,000 men will come under the influence of the Institute for two years or more. It is impossible to estimate accurately in dollars what additional contribution to the national wealth they will make through the benefit of the Institute's training, how much their spirit of energy and of resourcefulness

will mean in inventions and in industrial advancement, how many old industries they will improve or how many new industries they will establish, or what contribution they will make towards the promotion of a higher sense of civic duty and a higher standard of social efficiency. If, however, on the average they devote themselves seriously to such matters for twenty years after leaving the Institute, the enhanced value of their services to the state need only be \$10 a year to recoup the state for an annual contribution of \$100,000 towards their education at the Institute.

The figures given above indicate the attitude of the states throughout the Union towards higher education in *general*. Here, however, we are concerned with education of a special form, a form whose vital importance to the state can no longer be open to question. Fifty years ago when the Institute was founded much argument was needed to demonstrate that higher technical education was one of the great factors of industrial growth. Now that science has completely revolutionized the conditions of industrial and commercial life the question is no longer debatable. It is generally conceded that Germany's wonderful rise in the scale of commercial nations is mainly due to her steady and business-like efforts to promote the higher forms of technical education. Her success has been an impressive object lesson to the world, a lesson that this country and in particular this state cannot afford to ignore. The country as a whole has reached a critical stage of its development. Hitherto its natural resources have seemed almost limitless, and there has been little serious demand for the adoption everywhere of the most scientific, and consequently the most economic, methods of production and of distribution. There has been waste everywhere, until a national habit of extravagance has been formed. Now, however, the great diminution and in some cases the actual exhaustion of natural resources is being forced into evidence. Even in the matter of food supplies the United States appears to be rapidly approaching the turning point when it will cease to supply its own demand and will change from a food-exporting to a food-importing country. It is, therefore, a matter of national duty to train men who can face the new conditions. It is by the application of scientific methods that commercial and industrial efficiency can be improved, and waste can be avoided only by the aid of men thoroughly trained in the use of such methods. To train such men is the great task of the

technical schools, and these schools cannot do their work thoroughly without adequate financial support. This applies to technical schools everywhere throughout the country, but there are special reasons why Massachusetts should keep the lead that it obtained through the wisdom and foresight of its leaders half a century ago. That Massachusetts should attach special importance to technical education was clearly recognized by the committee on education in its report to the legislature that laid, in a practical way, the foundations of the Massachusetts Institute of Technology. This state has neither mineral wealth, nor great forests, nor conspicuous agricultural resources. It has no peculiar advantages of either soil, or climate, or conditions of labor. Its wealth and prosperity can be kept relatively high only by the exercise of superior intelligence, and to this end it cannot afford to have anything but the best in the field of technical education. Wisely was it set forth in the Constitution of the Commonwealth that "it shall be the duty of legislatures in all future periods of this Commonwealth to cherish the interest of the sciences and to encourage private societies and public institutions for the promotion of agriculture, arts, sciences, trades and manufactures."

RICHARD C. MACLAURIN.

The Society of Arts Flourishing

The Society of Arts was organized for the season of 1910-11 with the following executive committee: Richard C. Maclaurin, President of the Institute, Elihu Thomson, Theodore N. Vail, James P. Munroe, Carroll W. Doten, Frederic H. Fay, and I. W. Litchfield. The *Bulletin* of the Society has been enlarged and its name changed to *Science Conspectus* which will be issued during December, January, February, March, and April. It will present a general survey of the field of science and its applications in terms within the understanding of the lay reader. During the last two years 100 new members have been added to the roll. At the meetings in December, thirty-five new members were elected.

THE PRESIDENT'S REPORT

Real Educational Co-operation—New Course in Administration
planned—Research Work of High Grade—Fiftieth Anniversary of the Granting of Charter to be Commemorated

The President's annual report which was presented to the executive committee of the Corporation at its meeting December 14th is a document of unusual importance and interest, not only to Institute men, but to the general public as well. It treats the Institute broadly, dealing frankly with the more important problems before us and attaching deserved importance to the coöperative work which has developed during the last two or three years among the alumni and the undergraduates.

The most interesting feature of the report deals with the future of the Institute. Referring to the site question, the President says: "We are certainly much nearer a solution than we were a year ago and the prospect for an early settlement seems hopeful. Subsidiary to the problem of securing a new site is that of disposing of the old one. It seems probable that the Institute's property on Trinity Place can be disposed of advantageously in the not distant future and steps are being taken to make possible our removal from Boylston Street."

EDUCATIONAL COÖPERATION

The President also refers to the matter of coöperation with other institutions, particularly with Harvard and with Boston University, saying at the same time that, "No large scheme of coöperation can be carried through with any hope of its permanence while the question of the future site of the Institute remains unsettled." This matter was also mentioned in the President's report last year as well as in his speech at the reunion banquet in 1909, when he said: "There will be no more talk of merger with Harvard, but I

think we should be false to every precept of decency if we did not reciprocate most heartily the genuine expression of good will that President Lowell has so recently made, and I think we should be equally false to every precept of common sense if we failed to do our utmost to coöperate with Harvard wherever such coöperation is possible. I believe that in the domain of applied science there is much that we can do for our mutual help, but to make coöperation real and practical, we must be strong enough for independence."

As will be seen from the following quotation from the President's report we are already coöperating to a considerable degree with a number of educational institutions: "A number of the assistants and instructors at the Institute are engaged in teaching at the Boston Y. M. C. A., the Franklin Union, the Wells Memorial Institute, and the People's Institute. On a higher plane comes the work of assistants, instructors, and some of the professors in the Lowell Institute School for Industrial Foremen, an extremely important educational work that is carried on almost wholly by members of our staff. In the scheme of university extension which has recently been adopted the Institute contributes not only lecture rooms and laboratories for the use of a number of the professors, but gives the services of several of its faculty and some of their assistants. Professor Derr gives a course on physics, Professors Smith and Wickenden, courses on applied electricity and Professor Sumner, a course on the history of art and civilization. More direct examples of coöperation are afforded by the lectures at this Institute given by Doctor Stiles, the head of the Biological Department at Simmons College. As an offset to this help from Simmons, Professor Sedgwick gives a course of one lecture a week and Professor Prescott one of five hours a week during the first half-year at Simmons College. During the present year, Professor Despradelle gives regular lectures in architectural design at Harvard University. At the same university, Dr. F. J. Moore gives a lecture course of two hours a week on chemistry, Professor Dewey, two lectures a week, during the first half of the year on money, Professor E. B. Wilson of the Department of Mathematics is to give a course on the application of probability in theoretical physics, and Professor G. N. Lewis a special course on the principle of relativity. By special arrangement with the authorities of Harvard, the lectures of Professor Shimer on paleontology are being attended by a number of students from Harvard;

and next term a few of the students from the Institute are to take advanced courses in physiography at Harvard. The coöperative spirit is evidently at work; how far it should lead us in the future, is one of the larger problems that confronts us."

A COURSE IN BUSINESS ADMINISTRATION

The reference of the President to the contemplated new course to prepare men for administrative positions will appeal strongly to the whole alumni body:—

"A change that has not yet been effected, but which has engaged the attention of the Faculty and of the Executive Committee, has reference to the establishment of a course or courses that would prepare men more definitely for administrative positions in the arts and industries. A scheme for some such course was drawn up nearly ten years ago, and since then schools of business administration have been established in various parts of the country. It is felt by those who favor the change that there are special reasons for such work being connected with a school of applied science, partly because the method and the spirit of science form the basis of success in many important businesses, and partly because so large a share of modern business is concerned with the applications of science to industrial problems. There is a large and important field of work of this character that might be occupied by the Institute without encroaching on what is being done elsewhere in this community, and the occupation of this field would help to round out the system of education offered by the Institute."

RESEARCH WORK ON HIGH PLANE

The character of the research work done at the Institute is unusually high. President Maclaurin's general comment is as follows:—

"It is recognized by all who have studied the problem seriously that the spirit of research is vital to the success of a great scientific school. The Institute has been fortunate from the first in having connected with it a considerable number of men deeply imbued with this spirit, and it is encouraging to observe that an increasing number of able young men are being attracted to this field. The influence of such men is all for good and, in such an institution as this, there is no danger of the research element unduly predominating and making the courses too academic or too remote from the

pressing practical needs of the day. It is particularly gratifying to notice that we continue to retain the services of men of the front rank in pure science, a fact that has been emphasized by an impartial witness in a recent survey of American men of science. In the field of research, of course, it is quality and not quantity that is all-important. I have little sympathy with the elaborate efforts that are made in some places to turn out a great volume of research. The second-rate work might easily be dispensed with, although the first-rate is beyond price, and it goes without saying that to have first-rate work we must have first-rate men."

WORK OF PREPARATORY SCHOOLS ANALYZED

This data relating to the ranking of local preparatory schools compiled by the registrar is very comprehensive, as it takes in nearly one thousand students for a period of twelve years. The scholarship rating of these one thousand men has been found on a scale of one hundred—not that one hundred indicates a perfect grade of scholarship, but only determines the group to which the men belong in regard to ranking.

Upon examination of the data contained in this report it is found that the average percentage of graduates for the 984 students—whose records were considered—is 57; the average percentage of failures is 33; the average standing of students who graduate (scale 100) is 60; and the average standing of first-year records (scale 100) is 61.

UNDERGRADUATE INITIATIVE

"As does the number of students continue to be satisfactory, so there is no falling off in quality. Their health continues excellent and their spirit admirable. No better antidote to pessimism could be recommended than to get in close contact with such a body of young Americans. In the main they are men of ability, energy, and purpose, singularly free from sordid ambitions and anxious to do the best not only for themselves, but for their fellows. It is an encouraging study to trace the growth within recent years of student government at the Institute. This government concerns itself with athletics and with that great variety of interests grouped under the unfortunate title of "student activities." As regards athletics, the government is in the hands of a council composed of three undergraduates and four alumni without any representatives from the Faculty. This council has been conspic-

uously successful in establishing a sane athletic policy, aiming to make athletics a healthful exercise rather than an absorbing business. It encourages an active participation in manly sports by the whole student body rather than the development of exceptional skill by a few. It prefers competitions between individuals or teams within the Institute to frequent contests with other institutions, thereby avoiding such fevers of excitement as sweep over many of our colleges and tend to demoralize the entire student body. This athletic policy has been established by the undergraduates in coöperation with former students of the Institute; but the rules that have been developed to control the other "activities" are due in even larger measure to undergraduate initiation. Two years ago the Acting President directed your attention in his annual report to the establishment of the "point system," a system designed to eliminate one of the most serious faults in societies of students,—the undue loading of certain individuals with duties and honors. The system here initiated has been used as a model for similar schemes that have been adopted by various educational institutions throughout the country. In 1893 the undergraduates set up what is known as the Institute Committee, a committee that is regarded as the official representative of the entire student body. Its aim is to promote in all matters the welfare of the students, but for long it could work towards this end only by resolutions and petitions. In process of time it came to be recognized by the students here, as by more august assemblies elsewhere, that legislation to be effective must be associated with the power of the purse. During this year there has therefore been established a Finance Commission, composed of the President of the Institute Committee and two alumni. The power and expected effectiveness of this Commission are thus set forth by one of our graduates:—"The Finance Commission will have the power to insist upon a clear, business-like financial report being presented monthly by each activity. If the financial condition of any activity is such that, in the opinion of the Finance Commission the activity will not be able to pay any debt incurred, the Finance Commission will have the power to insist upon some guarantee from the activity that the amount to cover such indebtedness be raised. The results that this plan is expected to accomplish are chiefly three: *first*, by insisting on clear monthly reports, and the proper methods of accounting necessary for them, it will

allow every manager to know definitely at all times just where he stands instead of being willing to rely on guesses, as has been too often the case; *second*, by demanding in advance a guarantee of payment of debts, where a deficit is foreseen, it will prevent any recurrence of non-payment of debts, and thus give much needed protection to the good name of the Institute; and, *third*, by giving the students the advice and oversight of experienced business men, it will make the business training obtained through management of student activities always of real value instead of being often a positive influence for bad."

FIFTIETH ANNIVERSARY OF THE ESTABLISHMENT OF THE
INSTITUTE

Referring to the fiftieth anniversary of the granting of the charter to the Institute, the President says:—

"On the 10th of April next it will be fifty years since the charter of the Institute granted by the legislature was signed by Governor Andrew. The record of work accomplished in the half century that has elapsed has indeed been a remarkable one. The Institute has done pioneer work for education. Its methods and ideals have been carried into almost every quarter of the globe and into almost every phase of education. Its alumni have made important contributions to pure science, besides taking a large share in the work of applying scientific methods to the solution of the great practical problems of improving the health of the nation, opening up its territory, and developing almost every branch of its commerce and its industry. The impress that the Institute has made is all the more striking when we consider the small number of its students in the early days; and its great achievements under such conditions should inspire your Corporation with hope and confidence for its future. It does not seem proper that the fiftieth anniversary of its foundation should pass by without special comment. It has therefore seemed wise to the executive committee to adopt a suggestion made by the Alumni Council and celebrate this anniversary by holding a Congress of Technology on the 10th and 11th of April next. It is hoped that at this congress men of eminence will be present to set forth some of the broader results of the application of science to industry which it is the main purpose of this Institute to further and to indicate the gain in industrial efficiency that may be expected from the extension of its influence."

TECHNICAL EDUCATION IN AERONAUTICS

A Course Could be Started Now—The Framework Already Provided—Definite Course Suggested

The following paper read at the meeting of the American Association for the Advancement of Science by C. H. Peabody, '77, is of such present interest that we present it to the readers of THE REVIEW:—

The engineering world is so far committed to technical education as one source of supply of young engineers that there can be no question that special courses of instruction for aeronautical engineers will ultimately be established by our leading technical schools. The real question is whether now is a desirable time for certain schools to offer such courses.

There are several aspects to this question, all of which present difficulties; but the one which must first be found is that of financial support. If this is forthcoming at a given school it is not hazardous to predict that the school so favored will undertake to meet the other phases as they come up.

There is no question as to the demand for such a course; applicants have already appeared who perforce are taking the "next thing." Some applicants are so far in earnest that they will force their way into the new profession; others doubtless are merely attracted by the novelty of the latest development of engineering. In a profession that is forming, all successful workers must be pioneers, and real pioneers are so rare that many must be offered of whom a few will succeed. For this reason my opinion is that the course should be offered to undergraduates in order to get plenty; those who cannot qualify as pioneers will find their places in the great body of engineers who can follow paths already blazed.

One phase of the question which may not be without difficulty, is to find material for instruction. There is a flood of books, pamphlets and magazines on aeronautics most of which is ephemeral, and there will be only a small residuum of solid worth. But from it all a considerable mass of material for instruction

may be accumulated, as instanced by Lanchester's "Aërodonetics and Aërodynamics." Whether or not all the views of that author be accepted, he has shown in a masterly way the field to be occupied. The complementary field of aërography has already been well explored in the study of climate and weather.

But the special field of aëronautics is and always will be restricted as compared with the great background of general engineering. In the various courses of construction or engineering as offered by any of our leading technical schools, there is apparently a wide diversity, but what ought to strike our attention is the real solidarity of such courses. And the tendency is toward greater solidarity. For example, two courses as diverse as civil engineering and chemical engineering will each show a strong course in steam engineering; the instruction being wider and better than was given but a few years ago to mechanical engineers who took steam engineering as specially pertaining to their profession.

All this large background is now ready at any good technical school for use in building up a course in aëronautical engineering. To change the figures, the foundation and main structure are now ready and only the superstructure need be provided. And what is of even more importance than special instruction in the restricted field of aëronautics, is the cultivation of the mental habits that every engineer must acquire; and experience shows that the great body of subject-matter taught in technical schools does give students that habit of mind.

It is not unlikely that a technical school suddenly confronted with the task of establishing a course in aëronautical engineering might be most troubled to find the teachers. It might seem natural to turn to some one of the leaders in the recent development of aëronautics, and doubtless such a pioneer would have much to tell if he could be induced to do so, and had any gift of exposition. Is it to be supposed that a successful exponent of the arts of building airships and flying them could be induced to turn to the humdrum trade of teaching? if so, is there reason to expect that he would have or could cultivate the art of teaching? Perhaps!

The writer has had the good fortune to have means for securing lecturers on the profession which he is engaged in teaching. Some have been the leading naval architects and marine engineers of America and some were induced to make the voyage from France or England for the purpose. The success has been gratifying and

the stimulus to the students has been of the first importance. But such lecturers are, and must be, essentially ornamental; they cannot be built into the solid structure. That must be the work of the professional teacher.

The greater part of the teachers of engineering have been bred in the schools. They have acquired "experience" either in brief apprenticeships to the trade of engineering, or during vacations, or by serving as experts. All of these opportunities of contact with the real work of engineering are invaluable. There is a tendency, if the experience is really extensive, toward translation into the profession of engineering, and then a good teacher is lost. But to the teacher experience is worth most as influencing his habit of mind; there are other and better ways of collecting the material for instruction.

How does this bear on teaching *aéronautics*? Why, it leads to the suggestion that a young teacher of engineering be assigned to the duty, and given opportunity to gain experience. His tether should not be too long. An *aéronautical* laboratory is the natural adjunct to a course in *aéronautics* and in it would lie his real opportunity.

The writer is of the opinion that now is a good time to start a course in *aéronautics*. If the financial backing can be assured the course and the teacher can grow up together. Those taking the course would suffer no hardship in any case; during their course in school they would have the inestimable advantage of the enthusiasm of themselves and their teachers; those who find their way into *aéronautical* engineering will be worth the cost of the entire course; those who turn to more conventional branches of engineering will find their enthusiasm transferred with them. The writer, as already said, favors an undergraduate course, for reasons given and for others that would take too long to express.

In order to offer basis for a discussion and to give at least a semblance of reason for his opinions the writer offers a suggested course in *aéronautics*. It is made up by the ingenuous process of taking the course in naval architecture and marine engineering at the Massachusetts Institute of Technology, and writing down *theory of aéronautics, aéronautical design*, etc., in place of *theory of naval architecture, ship design*, etc. This will explain the existence of such courses as *hydraulics* and *electrical engineering*. The writer is convinced that a satisfactory course in *aéronautics* could

be given substantially as written down; his reason is that the course in naval architecture has proved to be satisfactory and reasonably complete. He further knows that the general engineering background is sufficient to prevent anyone from being stranded. But the writer begs that he may not be held responsible for finding the subject-matter for the course of instruction specified in *aéronautics* or *aéronautical design*, nor would he venture to restrict instruction to the numbers of lectures written down.

SUGGESTED COURSE FOR AERONAUTICAL ENGINEERS

First year: lectures and recitations: mathematics, 120 hours; chemistry, 90; modern languages, 90; literary subjects, 90. Drawing and laboratory: chemical laboratory, 120; mechanical drawing and descriptive geometry, 180; freehand drawing, 45.

Second year: lectures and recitations: elements of *aéronautics*, 20; mechanism, 75; metallurgy of iron, 15; mathematics, 90; physics and precision of measurements, 160; descriptive geometry, 45; applied mechanics, 45; literary subjects, 90. Drawing and laboratory: mechanical drawing, 150; physical laboratory, 30; mechanical laboratory, forging, 60.

Third year: lectures and recitations: theory of *aéronautics*, 45; construction of airships, 20; heat engineering, 120; mathematics, 30; applied mechanics, 75; hydraulics, 20; literary subjects, 120. Drawing and laboratory: *aéronautic* drawing and design, 165; physical laboratory, 15; engineering laboratory, 15; forging and chipping and filing, 90.

Fourth year: lectures and recitations: theory of *aéronautics*, 60; *aérogaphy*, 30; dynamics of machines, 20; applied mechanics, 45; electrical engineering, 30; gasoline engines, 45; applied chemistry, 15. Drawing and laboratory: *aéronautical design*, 200; *aéronautical* laboratory, 90; engineering laboratory, 60; electrical engineering laboratory, 15; foundry, 30; machine tool work, 120; gasoline engine design, 90; thesis.

A CONGRESS OF TECHNOLOGY

Fifteenth Anniversary of the granting of the Charter to the Institute to be appropriately commemorated on April 10th

On the 10th of April next it will be fifty years since the act of the legislature granting the charter to the Massachusetts Institute of Technology was signed by Governor Andrew. In the half century that has elapsed the Institute has steadily advanced in power and influence, its graduates have taken a leading part in opening up the country, in developing its industries, in conserving the health of its citizens, and generally in adding to the national welfare by the application of scientific methods to the great practical problems of the day. In addition its educational policy has served as a model for numerous similar institutions in this country and abroad. It is therefore felt that the fiftieth anniversary of the granting of its charter is an event of more than local interest and that its celebration should be freed from all provincialism and made the occasion of emphasizing the benefits that have already been derived by applying science to industry and the still greater benefits that may be expected when all great problems are attacked in the scientific spirit and by the scientific method. For this purpose a Congress of Technology is to be held in Boston on April 10 and 11 and at this congress men of prominence from all parts of the Union are to give addresses, laying special emphasis on the saving of waste and the increase of efficiency that are due to science. Nearly all these men will be alumni of the Institute, and it is hoped that their united efforts will form an impressive demonstration of the power of the Institute's spirit to deal with the great practical problems of today and of tomorrow. With the active support not only of the alumni, but of other leaders of industry throughout the country, this congress should make a notable contribution to the advancement of applied science and the improvement of industrial efficiency.

RESULTS OF THE ALUMNI ELECTION

As a result of the recent vote Arthur Amos Noyes, professor of physico-chemical research at the Institute, has been elected president of the Alumni Association for the coming year.

The other officers elected are as follows: Vice-president, Frederick K. Copeland, '76, of Chicago, president of the Sullivan Machine Company of that city; secretary-treasurer, Walter Humphreys, '97, of Brookline (reëlected).

For the executive committee the following announcements were made: Frank W. Hodgdon, '76, chief engineer of the Massachusetts harbor and land commission, and Eugene C. Hultman, '96, consulting engineer and auditor, of Boston; for representatives-at-large, Oakes Ames, '85, president of the Lamson Consolidated Store Service Company at Boston; Harry E. Clifford, '86; Gordon Mackay, professor of civil engineering at Harvard University; Howard L. Coburn, '98, chief engineer of the Ambursen Hydraulic Construction Company of Boston; Willis R. Whitney, '90, director of the research laboratory of the General Electric Company of Schenectady, N. Y., and non-resident professor of theoretical chemistry at the Massachusetts Institute of Technology.

The term members appointed to the Corporation are Henry Howard, '89, Henry A. Morss, '93, and Arthur Winslow, '81.

Mr. Howard, who was a special student in chemistry, is vice-president of the Merrimac Chemical Company. He became identified with this concern immediately after leaving the Institute, first as a chemist, later as assistant superintendent, superintendent and vice-president. He is chairman of the executive committee of the Manufacturing Chemists' Association of the United States; chairman of the committee on public utilities, and member of the metropolitan improvement committee of the Boston Chamber of Commerce; member of the commission on the workmen's compensation, Commonwealth of Massachusetts; organizer and first chairman of the New England section of the Society of Chemical Industry; member of the Institute of Chemical Engineers; member of the American Electro-Chemical Society of the American Chemical Society.

Mr. Howard was treasurer of the Second All-Technology Reunion, and is now chairman of the committee on aeronautics appointed by the Alumni Council.

Mr. Morss, who is a brother of Everett Morss, also a term member of the Corporation, is a graduate in the course of electrical engineering. On leaving the Institute he entered the employ of The Simplex Electrical Company, and in December, 1903, became vice-president of that company. In January, 1905, was made director and vice-president of The Morss & Whyte Co., and in January, 1906, became a trustee of The Morss Real Estate Trust; he holds all of these positions at the present time.

He served as president of the class of '93 for two years, 1908-09; is a member of the Technology Club, and has been member of its council. He is member of the committee on aeronautics, appointed by the Alumni Council.

Mr. Winslow, who is a graduate in mining and geology, is identified with mining interests, being president and general manager of the United States & British Columbia Mining Co. and of the Liberty Bell Gold Mining Company. He was for some years after graduation assistant geologist of the Pennsylvania Geological Survey. He afterwards became a consulting engineer, devoting his attention wholly to examination of mines in Virginia, North Carolina, Arkansas and Missouri. He is the author of a number of reports and publications on geology and mining subjects. He was one of the managers of the American Institute of Mining Engineers and is a former president of the Colorado Mine Operators' Association. He is a fellow of the Geological Society of America.

October Technology Reviews Wanted

If any of our readers have an extra copy of the October REVIEW that they do not want, we shall be very glad, indeed, to receive it. Although we printed a very large edition of this number, we only have a few copies left and there are frequent calls for them.

A REMARKABLE SHOWING

What State Scholarships at Technology have done for Massachusetts Students

Twenty state scholarships were established at the Institute by act of the legislature in 1888, on the basis of an appropriation of \$100,000, only ten being actually available in 1888-89. In 1895 the number was increased to 40 by an annual appropriation of \$4,000 for the additional 20. Since that time the tuition fee has been increased to \$250 per year, so that if the original grant yields 4%, the state now receives each year for its \$8,000 what would cost individual parents \$10,000, and what actually costs the Institute nearly \$19,000.

The award of these scholarships has always been made by the State Board of Education on the basis of residence of the applicants, with due consideration of their need and merit. At first the demand for them was not greatly in excess of the supply. Of late years, however, the number of applicants has been so large that it has been the policy of the board to divide each scholarship in halves, leaving the applicant to bear the remainder unless assisted from other sources.

A review of the records shows that 412 persons had received state scholarships from their establishment up to and including the class of 1909, the average aggregate grant per student being thus about \$315. Of these, 325 or nearly 80% have been graduated; of the 412 the addresses of 33 are unknown, and 13 have died; of the remainder 161 are residents of Massachusetts, most of them actively engaged in its industries. Of those in Massachusetts 23 are connected with the Institute, mainly as members of its Faculty; 15 are in the service of great engineering corporations, as the General Electric Company, the Telephone and Telegraph Company, the Fore River Ship Building Company, etc.; 18 are engineers; 7 architects; 8 chemists; 2 teachers; 3 lawyers; 9 are in the service of state commissions; 5 are superintendents in manufacturing; 5 are managers; 2 treasurers, and 1 a president. Out-

side of Massachusetts, 19 out of 20 are in New England; 20 are in the service of the United States; 9 are professors in other colleges; 4 are in Mexico; 3 in Germany; 2 each in the Panama Canal Zone, Nova Scotia and China; 1 each in Porto Rico, Quebec, British Columbia, Scotland, South Africa, Chili, and Russia.

Without mentioning names of individuals, the list of former state scholars includes, for example, the assistant director of one of the most important research laboratories in the country, a professor of civil engineering in China, a superintendent of a great manufacturing establishment near Boston, the manager of an important manufacturing company in Scotland, the water-supply engineers of two of the larger cities of the United States, a leading civil engineer of Boston, a president of a great engineering corporation, and of a Canadian technical college.

It is difficult to see how the bounty of the state could have been used with greater advantage to its recipients or to the state.

In regard to the present situation, it may be added that there were for the present year 182 scholarship applicants, residents of Massachusetts, and that the amount which it was found possible to grant them was, in addition to the 80 half-scholarships of the state, \$13,525. It is estimated that not less than \$10,000, representing 40 additional scholarships would have been needed to meet the needs of thoroughly meritorious applicants.

An Appreciation from the Corporation

At the meeting of the Alumni Council held November 7, the following letter in regard to the Income Fund was received from the secretary of the Corporation of the Institute:

"At the last meeting of the Corporation of the Massachusetts Institute of Technology, the President made an informal report on the expenditures in successive years of the Alumni Fund, and it was voted that there be expressed to the alumni of the Institute the very high appreciation of the Corporation of their liberality in raising this fund which came at a most critical time and which has been of the greatest importance in the development of the Institute."

GENEROUS CONTRIBUTIONS COMING IN

Major Briggs' appeal for Athletics finds ready response—Un-named donor gives \$2,000—To put Field in Prime Condition

Major Briggs, treasurer of the Advisory Council on Athletics reports that the total paid subscriptions to the athletic fund to date for the improvement of conditions at Technology field, amount to \$2,673.50 given by 153 subscribers as follows: 1 of \$1,000; 2 of \$100; 5 of \$50; 21 of \$25; 35 of \$10; 60 of \$5; 1 of \$3; 3 of \$2.50; 13 of \$2; 12 of \$1. When Technology field was laid out, the corporation leveled the football field and practically built the track. The corporation was willing to go to the expense of building a fence around the track itself, but did not feel able to enclose the entire field, or to appropriate sufficient funds for observation stands, dressing rooms, bathing facilities and other needed appurtenances.

At this juncture, a friend of the Institute, not an alumnus, to whom credit is largely due for the development of outdoor exercise at Technology, made a generous offer of money for the improvement of Technology field. This gentleman, under the plea "that he wanted to do something for the boys; for the welfare and development of the student himself," told Major Briggs, then chairman of the Advisory Council, to go ahead and fix up the field, build a suitable grand stand with dressing rooms, baths, etc.; also an open field stand, and send the bill to him with the strict understanding that his name be not mentioned in connection with the matter. He recently wrote Major Briggs as follows: "You may call on me during the coming year for any sum you desire, not to exceed in all \$2,000 for improvements in Technology field. It seems to me that the work you are doing is of real benefit to the Institute students for their future work in life and brings out certain powers and qualities which might otherwise not be as fully developed."

The contributions of the alumni as noted above are larger than they have ever been before, showing an appreciation of the results

of a sane and well-rounded athletic policy. Among the letters received is one from an alumnus in Colorado enclosing \$10 which reads, "I take great pleasure in sending you my small mite towards the athletic fund, and wish I could subscribe a great deal more. The cause is a good one,—I wish every M. I. T. student could be *forced* to use the field."

The following comes from New York:—"When I look back upon the facilities which we had in the early nineties, I can quite see that the cost of living has gone up everywhere, even in athletics. At the same time, I take pleasure in enclosing you herewith my check for \$25 and my best wishes for the success of the movement."

The advisory Athletic Council expended \$680.79 last May and June for an addition to the portable house used as a dressing room, for doubling bathing facilities, etc. This expenditure came from the sum subscribed by the alumni, leaving a cash balance of about \$2,000, which with the subscription of \$2,000 from the friend mentioned above, makes about \$4,000 on hand. The Advisory Council will need the entire sum of \$5,000, to place Technology field in good working condition, and before beginning on this work, wants to see that amount of money in hand. Undoubtedly many friends of athletics who have not before realized what the development of athletics has meant to Technology, will feel it a privilege to help swell the fund to the needed amount.

How Non-Resident Alumni Can Help

The committee on State Aid is doing very effective work in bringing before the legislators the value of the Institute as an asset of the state of Massachusetts. There may be a number of men outside the state who have personal acquaintance with members of the legislature. Such men can be of much service in showing what the Institute stands for in general and how it is conserving the industrial resources of Massachusetts.

There are over 3,000 former Technology students living in this state. If our law-makers could really know the real value of these men to the Commonwealth there would be no hesitancy in giving the Institute generous support.

TECHNOLOGY HIGH IN PURE SCIENCE

From Some Points of View It Leads all Other Institutions

The biographical directory of *American Men of Science*, edited by Professor Cattell of Columbia University in 1903 has just been reissued and an interesting comparative study of the changes from 1903 to 1910 has been published by the editor. Some of the facts brought out are of particular interest to Technology men.

It should be noted at the outset that the statistics given relate wholly to the advancement of science, so that some of our strong engineering departments are not represented. Again, the comparison of institutions is to a large extent the comparison of graduate departments since it is these which bear the closest relation to the advancement of science. Under these conditions it is, therefore, particularly gratifying to find that in chemistry the Institute "easily leads" all the colleges and universities of the country, and that in the pure science departments of physics and mathematics, where graduate work is not yet developed, it stands sixth and ninth, respectively.

The institutions which have made, since 1903, the largest gains in the total number of their leading scientific men are: Harvard, 14; Wisconsin, 12; Chicago, 10; Yale, 8; the Institute of Technology and the Carnegie Institution, 7 each. The total present numbers are: Harvard, 79½; Columbia, 48; Chicago 47½; Yale, 38; Cornell, 35; Johns Hopkins, 33½; Wisconsin, 30; M. I. T. 25, etc., fractions representing part-time service. The only other technological institution having three or more is Worcester, with just that number.

In a comparison with certain other educational factors, it appears that the Institute has one of the leading scientific men for every ten members of its instructing staff; Harvard, one in eight; Yale, one in eleven, etc.

In comparison of the number of scientific leaders with the value of its real estate, the Institute stands first, with one for each \$53,000 of property. Harvard has one for each \$138,000, while

certain institutions near the other end of the list are credited with more than \$600,000 for each scientific leader.

In the proportion of scientific men to current income, the Institute is again near the head of the list.

There are six more graduates of the Institute in the leading thousand scientific men now than in 1903.

One Teacher to Every Seven Students

The *Bulletin* of the Society for the Promotion of Engineering Education for October and November contains interesting notes on the German technical universities by Dean Shepard of the L. C. Smith College of Applied Science of Syracuse University. On one statistical point it seems likely that Dean Shepard's information is defective, namely: the numerical ratio of teachers to students, which he gives as averaging for the six German institutions 8.8 students per teacher, the extremes being 5.2 in Dresden and 16.5 in Munich. Dean Shepard expresses doubt if there is any American engineering college that has as large a faculty in proportion to its student body as is shown by these figures. A reference to the special bulletin of the Carnegie Foundation on the financial status of the professor in America and in Germany shows, however, that at the Institute there are only 6.7 students per teacher, at the Worcester Polytechnic, the Armour Institute of Technology, and the Stevens Institute slightly more than 10.

New Associate Members

The following former students were elected associate members of the Alumni Association on the dates indicated:—

November 28, 1910: Charles Edwin Belcher, '93; Samuel Pomeroy Colt, '74; Frederick E. Hill, '82.

December 22, 1910: Harry D. G. Baxter, '10; Tyler W. Carlisle, '10; Benjamin Hammond, '09; Benjamin Shuman Hirschfeld, '10; Ruth Ogden Pierson, '09; Paul Ellis Thompson, '10; James Gregory Tripp, '10.

STATE AID GIVEN BY OTHER STATES

In a comparison of the amounts appropriated by different states, in 1909, for the support of universities, colleges and technological schools, Massachusetts ranks somewhat below South Dakota and Oklahoma in the *total* amount spent, and spends only about one sixth as much as the great commonwealths of the north-central group,—Minnesota, Michigan, Wisconsin, and Illinois. A fair comparison must, however, take account of the wealth of the state. Taking as the latest available figures the estimated wealth in 1904 and the average appropriation for the four years 1906–1909, it appears that Massachusetts contributes annually to higher education only \$29 for each million of its wealth. The only state which is less liberal than Massachusetts is New Jersey, which appropriates \$16 per million per year. New York gives \$44, Connecticut \$38, Pennsylvania \$49, Delaware \$39, Tennessee \$45. No other state gives less than \$50, and the average for the entire country is about \$150. Near the other end of the scale are:

Oklahoma,	\$336	South Carolina,	\$432
Colorado,	308	Nevada,	403
Utah,	455	Washington,	646
Wisconsin,	314		

While the high ratio in some of the Western States naturally represents in part expenditure for a new plant, it is evident that some of the Eastern States, including Massachusetts, are leaving their higher education to depend too much on the generosity of private benefactors and abnormally high tuition fees. Whatever may have been the case in the past, this policy is no longer safe.

Moreover, it is to be noted that of the small contribution made by Massachusetts, nearly the whole is devoted to agricultural education. Without questioning that this share is all needed and excellently used, it would appear that the dependence of the state on its manufactures and commerce is such as to require more adequate support for education in engineering and other forms of applied science.

PRESIDENT MACLAURIN ON COOKE'S REPORT

A reply written at the request of the Editor of the New York Tribune that reduces the "Student Hour" to an absurdity

The latest bulletin of the Carnegie Foundation has many attractive features. The report has evidently been made up in a spirit of good will to education, and any sting that it may contain should be removed by the admirable introduction by Doctor Pritchett. In the course of more than a hundred and thirty large pages the author, Mr. Cooke, makes a number of excellent suggestions, which are none the less excellent because of their lack of novelty. He is aware that the charge of Philistinism might easily be suggested by the tenor of his remarks, and he makes some effort to protect himself accordingly.

His peculiar point of view seems to give undue prominence to "the cost per student hour," but although we hear much of this phrase in the report we are distinctly told in one place that "it should be borne in mind that the cost per student hour has absolutely no value in distinguishing relative educational values." If this had been placed as a headline to all the pages it would have greatly improved the value of the report and would have been in harmony with this other admirable sentence, which might with equal propriety have been inserted as a footnote to every page: "In the last analysis the usefulness of a university is the measure of its mental, moral and spiritual product—and product interpreted as broadly as you please."

Although there is much that is excellent in the report, it has many weaknesses. It is written from the point of view of the man who is used to report on the efficiency of a glue factory or soap works. Whenever it touches the strictly educational field and gets away from the soap factory the trail of the amateur is over it all. It is full of commonplaces, and there is scarcely a question raised that has not been discussed *ad nauseam* by college professors and other officers. It is not lacking in confidence. One marvels at the temerity even of an "efficiency engineer" who can lay

down the law so definitely as to how to teach physics, how to conduct a recitation, how to carry on research, when most of us who have devoted our whole lives to such problems are far less confident.

There are, however, here and there some pleasing evidences of diffidence. In discussing the important educational problem of janitor service Mr. Cooke says, "a sharp line should be drawn, probably, between the cleaning of the buildings and the care of apparatus." The use of the word "probably" is a master stroke. It conjures up pleasing pictures of janitors handling the delicate instruments of a physical laboratory just as they furbish the brass plates of a glue factory—if, indeed, "the snap and vigor of the business administrator" which Mr. Cooke admires so much should decree that such things are a necessary adjunct to the dignity of the factory.

Almost on a par with this use of "probably" is the statement that "there is a good deal of the feeling that lectures to be good must in a way bear the marks of the inspiration of the moment. But a good many men who have the reputation of being high authorities assured me that the carefully thought out plan for a series of lectures would win out every time over the inspiration of the moment idea." Of course, they assured Mr. Cooke of this, but they must have smiled at the naïveté of the question and wondered whoever suggested that the presentation of a scientific subject be left "to the inspiration of the moment."

The report shows many evidences of ignorance of educational history. It suggests as novelties plans that have been tried for centuries and abandoned only after most careful consideration. Such, for example, is the suggestion that the rules for the conduct of the students and the punishments for their breach should be put into precise form. The collection of such rules from the archives of the older universities would fill many volumes. Again, he says: "It may turn out that ultimately the matter of examinations will be handled by an agency outside of the department." This, to his vision, is a far-off divine event to which the whole educational creation is moving. If so, it is moving backward.

Mr. Cooke's remarks on the economic use of rooms and buildings are mostly eminently sensible, although he contributes nothing new to the discussion of a very old problem. His economic sense is shocked on learning that a lecture room in the depart-

ment of physics is used only four hours a day, just as it must be shocked when a church is used only a few hours a week or a life belt only when it is actually needed. In some of his criticisms under this heading he seems to forget that colleges have to make the best of the materials that are available, and that in many cases an apparently uneconomic use of rooms is forced upon them because their buildings are old or were designed for other purposes than those to which they have now to be put. He commends one institution for a space-saving device and wonders that it is not adopted in all departments, the fact being that the newer buildings were designed for its use, but the older ones were so constructed that its adoption there would not have been a real economy.

Mr. Cooke displays unusual weakness when he takes up the subject of research. Indeed, most of what he says on this subject must be received with that mixture of astonishment and embarrassment with which we listen to the words of a distinguished friend who pronounces an absurd judgment on an important subject that he has evidently not mastered. Listen to this: "I believe there is a distinct disadvantage to undergraduate students to be near research work. I think in the case of physics research workers, their good influence is more than offset by the introduction into the undergraduate laboratories of the necessarily deliberate and experimental methods of the research laboratory." How unfortunate if "deliberation" and the "experimental methods" should contaminate the laboratories—it might detract from the "snap and vigor" of these promising undergraduates. And yet one wonders what possible use there can be in teaching physics at all if so much care is to be taken to guard the students from catching its spirit and grasping its method. We, in our ignorance, had imagined that the method and the spirit of science were its very essence, especially where undergraduate learning is concerned. We should have accounted any system of education that failed to recognize this as but so much dross and dung (if, at this season, a Scriptural phrase may be permitted), even if it resulted in every undergraduate gaining 100% in the examinations conducted by Mr. Cooke's "bureau of inspection."

Perhaps enough has been said to indicate that there are serious blemishes in this bulletin. If, however, it be taken for just what

it is worth, it can do no harm and may do much good. We should regard as a friend every one who helps us to improve our methods, and if this report enables us to keep our accounts better, or make a more economical use of our machinery, of course it will be heartily welcomed. The most serious objection that I see to it lies in its abuse rather than its legitimate use. I fear that it will tend to increase the administrative machinery of our educational institutions, machinery that is already far too much in evidence. When one listens to all the criticism of our colleges and thinks of the great things that have been accomplished elsewhere with so little machinery and so little noise, one wonders whether it might not be better for us also to settle down to quiet work.

Then I confess that all this talk of cost a student hour strains my patience to the limit, especially when it is presented under the heading "gauge of efficiency." Mr. Cooke frankly recognizes its uselessness to this end, but others may be led astray by the specious analogy with the workings of a factory. Already there are plenty of forces at work to give sufficient prominence to mechanical conceptions and mechanical tests. It does not require any special effort in this country to stimulate admiration for the "snap and vigor of the business administrator," and the value of snap in the domain of education may very easily be overestimated. Especially am I fearful of its effect on the teacher and the investigator. His path is not too smooth already, and even now there are many forces drawing him from the educational sphere where best he can serve society. Think for a moment of the effect on men like Newton or Faraday of the "snap and vigor" treatment that Mr. Cooke suggests in his discussion of research. They must make frequent reports on the progress of their research and constantly justify the expenditure thereon. The superintendent of buildings and grounds, or other competent authority, calls upon Mr. Newton.

Superintendent of Buildings and Grounds—Your theory of gravitation is hanging fire unduly. The director insists on a finished report, filed in his office by 9 a. m. Monday next, summarized on one page, typewritten, and the main points underlined. Also, a careful estimate of the cost of the research a student hour.

"Newton—But there is one difficulty that has been puzzling me for fourteen years, and I am not quite—

Superintendent of Buildings and Grounds (with snap and vigor)—Guess you had better overcome that difficulty by Monday morning or quit.—*New York Tribune*, December 25.

The Average Age of Our Alumni

The present size of the Institute, and the large number of its alumni, may easily give an erroneous impression in regard to their industrial efficiency and financial strength. Since the earliest class was graduated forty-two years ago, it might be supposed that a still larger number of graduates than is actually the case would now occupy conspicuous positions in the industrial and financial world. The factor which is easily overlooked in this connection is the rapid increase in the size of classes and the consequent low average age of the graduates. The total number of graduates (Bachelors of Science), up to 1909 inclusive, was 4,318, of whom 4,107 were living. Of these more than half have received their degrees during the ten years 1900–1909. The average length of time for all the graduates since graduation is only a little more than eleven years. Taking 23 as the average age at graduation, the average age of all the graduates would thus be only 34 and a fraction. The men who have been out as much as twenty years, with corresponding opportunity for achievement, number only about 550.

The '01-'10 Luncheon Club

The classes from 1901–1910, inclusive, held a joint smoker at the Tech Union on the evening of December 23. Although it was held just before Christmas nearly a hundred men turned out and enjoyed a very pleasant evening. It was decided to hold weekly luncheons at the Rathskeller of the American House every Friday from 12.30 to 1.30, the first meeting to begin December 30. For the present these luncheons will be informal and Tech men of these classes can drop in any time during the hour. No general notice has been sent out by mail, those present volunteering to tell their classmates of this luncheon arrangement.

A LIVELY WINTER PROGRAM

Local Alumni Associations Active—Weekly Luncheons at Providence—Pittsburg Club Serenades Purdue and Cornell—New York Banquet January 21

TECHNOLOGY CLUB OF BUFFALO.—The season opened with a rousing dinner at the Buffalo Club on October 19, twenty odd members present.

Deacon Shed, who had been working his muse overtime for several weeks uncoiled himself from several yards of quatrains, sonnets and limericks (he was very strong on the latter). The burden of his song was "Who hit Henry Boyd with a wet towel."

Professor Morgan of the University of Buffalo, Canisius College and the Grosvenor Library next touched lightly on everything disreputable in the past careers of the members present.

The old favorites were sung over and over until the pianist refused further encores on "Queenie."

After adjournment two bowling teams captained by Frank Lane and Carl Houck played for the Club Championship, Lane's team winning. Houck's team was superior in the vulgar technique of the game, but Lane showed his Tech training when it came to working higher mathematics on the score sheet.

The next meeting will be a Christmas celebration on December 23 at the Buffalo Club. Frank Lane by virtue of his paunch will act as Santa Claus.—*W. H. Watkins, '95, Secretary, P. O. Drawer 57, Buffalo, N. Y.*

THE PITTSBURG TECHNOLOGY ASSOCIATION.—The association held its second smoker of the season, at the University Club, on Saturday evening, November 19. Although we have had smokers and smokers, they all fade into insignificance when compared with the Tech spirit, enthusiasm and novelty of this one. All business was dispensed with and the entire evening was devoted to social divertisement. The star performance was presented by Sumner B. Ely, '92, who exhibited the most wonderful card, coin and ring tricks producing an entire landscape and menagerie from the im-

maculate recesses of his evening suit and in general presenting a most mystifying exhibition which cast Keller and Hermann far into the shade. When we say that Ely is a better president of the association than prestidigitator, the reason for the wonderful success of the association is explained. There were forty in attendance, including members from the class of '87 down to '10. Eighteen different years were represented. After the arranged program had been carried through, each member arose and spoke for himself. During the "interims" we smoked, filled our steins and sang the old songs of Technology. While our festivities were at their height, it was suggested that we visit our brother collegians of Purdue and Cornell who were holding meetings in other parts of the University Club. With stein in hand and a ringing song, we visited the two college gatherings and after exchanging felicitations, returned to our quarters. Our two groups of friends in true college spirit returned our call at once and such a gathering has not occurred in Pittsburg for many years. First Tech was cheered, then Purdue, then Cornell, and then they were all cheered together. There were about one hundred and twenty-five men present and all joined in a toast to the memory of Bullard, '87, and with uplifted stein, sang lustily the Stein song. The scheme which we have been carrying out of giving free smokers has worked so well that we suggest it to other alumni associations. The amount of expenditure is not large and the funds are provided by our Guarantor Association. This plan gives every one of the boys, no matter what his circumstances are, an opportunity of getting together and becoming acquainted. A hearty invitation is extended to Tech men who may be in this vicinity to meet with us at any of our gatherings. If in town, call up the secretary and let us get a line on you. The officers for 1910 are: President, Sumner B. Ely, '92; vice-president, Henry D. Shute, '92; secretary-treasurer, Waldso Turner, '05; executive committee, Fred Crabtree, '89, Warren I. Bickford, '01, and L. K. Yoder, '95; alumni representative on the council, H. H. Rapelye, '08.—*Waldso Turner, '05, Secretary-Treasurer, 1174 Frick Building Annex, Pittsburgh, Pa.*

TECHNOLOGY CLUB OF RHODE ISLAND.—The Technology Club of Rhode Island held a smoker in the rooms of the Providence Art Club, No. 11 Thomas Street on the evening of Saturday, December 3.

One hundred and thirty-five notices were sent out and sixty-five replies were received, fifty of these accepted and forty-five attended.

A short business meeting preceded the social entertainment at which President James G. Woolworth, '78, presided. Several minor changes were made in the constitution which was adopted several years ago by the earlier Tech Club of Rhode Island and it was voted to accept it for the present organization. The suggestion of the executive committee that the Tech men in Providence try to lunch together one day in each week was received enthusiastically and it was voted to fix Thursday, December 15, as the date of the first luncheon.

The luncheons are to be held at Brucker's Hotel, 317 Westminster Street at 1 p. m. and any Technology man who is in Providence on any Thursday will be sure to find a hearty welcome if he will drop in. The cost of the lunch is fifty cents.

An entertainment followed contributed by members of the club and by several outside amateur entertainers.

Professor Homer, '85, and Dr. W. Louis Chapman, '95, provided the musical numbers on piano, flute and cello. J. H. Cady, '06, sang and H. H. Clark, '98, gave several amusing recitations.

A unique burlesque musical number by Henry B. Chase, and a sleight of hand performance by John Percival concluded the prepared program. Beans, spaghetti and crackers and cheese occupied everyone's attention for a while and the social side of the meeting was well attended to.

The committee feel that the Technology Club of Rhode Island has been roused from its lethargy and if the lunches prove to be well attended the M. I. T. men in this vicinity will be better acquainted before very long. An attempt will be made to get all the members of the club to attend the basket ball game between Brown and Tech which we understand takes place in February. The president was authorized to appoint a member of the executive committee. President Woolworth named Lewis D. Nisbet, '09. The member of the Alumni Council is Prof. E. B. Homer, '85,—*William C. Dart, Secretary, 148 West River Street, Providence, R. I.*

TECHNOLOGY CLUB OF PUGET SOUND.—The following men met at the Hotel Butler on Saturday evening, November 19, for dinner: A. W. Sawyer, '72; Frank Dabney, '75; H. H. Plummer, '85; C. H.

Alden, '90; M. W. Greer, '91; A. J. Farnsworth, '94; H. M. Loomis, '97; A. C. Lawley, '97; W. S. Matheson, '99; C. M. Lewis, '99; E. G. Allen, '00; W. J. Sayward, '01; S. A. Gardner, Jr., '02; J. R. Morse, '03; G. B. Harrington, '04; L. A. Wallon, '04; L. T. Bushnell, '05; S. T. Hyde, '05; T. P. Moorehead, '05; C. M. Simmers, '05; E. S. Manson, '06; Q. P. Emery, '06; S. J. Egan, '07; E. F. Whitney, '07; J. H. Walsh, '07; and A. G. Place, '08.

After dinner, President Dabney reviewed the life of the club from the time of the first gathering in 1904 through the formal organization in November, 1908, when Dean Burton was present to the gathering of the evening. He then called on Mr. Sawyer who responded with a few well-chosen words on the "M. I. T." in the early days. Following Mr. Sawyer, Mr. Hyde spoke on the Reunion of 1909; Mr. Lewis, on The Portland, Oregon, Club; Mr. Sayward on the College Club which is being formed in Seattle; Mr. Bushnell read some advance copy of the *Technology Review*; and the secretary read a very enthusiastic and encouraging letter from Mr. I. W. Litchfield, '85, giving much interesting data concerning Tech and its doings, announcing that we will be able to have the moving picture films of the 1909 Reunion to show at the next meeting and suggesting that we appoint a representative to the Alumni Council.

It was moved and unanimously voted that we appoint Mr. I. W. Litchfield, '85, to represent the club.

The club proceeded to the annual election of officers. Frank Dabney, '75, was unanimously reelected president, and L. A. Wallon, '04, was elected secretary.

C. M. Lewis then called to the attention of the club the fact that the advantages of other colleges were presented to the high schools of the city and suggested that we take steps to have the great advantages of M. I. T. presented to the high schools of Seattle and Tacoma. The president was authorized to appoint a committee of five to take up the matter and make the proper arrangements and get together the proper data to be presented.

The club then adjourned to the piano, E. G. Allen presiding at the "box," and joined in songs and a good old cheer for M. I. T.—
L. Arthur Wallon, Secretary, Seattle Electric Company, Seattle, Wash.

TECHNOLOGY CLUB OF PHILADELPHIA.—The season of the Technology Club of Philadelphia was opened on Saturday evening, November 5, when a smoker was held at the Southern Club. The attendance was large and included several members of the last graduating class. Tech music was enjoyed and light refreshments were served. Mr. James Swan, '91, told in a very interesting manner of his recent trip to Turkey.

The next smoker will be held on Thursday, December 15, at the Southern Club. Mr. Sacerdoti, resident engineer of the American-Laurenti Submarine Company, will speak on the "Laurenti Submarine." All Tech men, especially new arrivals in Philadelphia, are urged to get in touch with the club.—*Percy E. Tillson, '06, Secretary, 223 So. 61st St., Philadelphia, Pa.*

THE TECHNOLOGY CLUB OF NEW YORK.—The annual dinner of the club at Hotel Knickerbocker, Broadway and Forty-second Street, on Saturday evening, January 21, is the event prominently in the minds of Tech men in and around New York. All Tech men are invited and it will be the occasion of bringing here many men from up state, as well as from Philadelphia, New Jersey, Connecticut and Boston. Like all dinners of college men in New York, it is being more widely recognized every year as requiring the attendance of all alumni for miles around who can possibly be present, as it affords a splendid opportunity in the most pleasant environment for annual reunion of classes, for keeping in touch with *alma mater* and for advancing her cause. The New York Tech dinner, is "in the public eye" and all business and other responsibilities are then to be laid one side for a magnificent and unanimous testimonial to the Institute and a fine good time. The banquet hall of the Knickerbocker in its new and elaborate decorations, will welcome the largest gathering of Tech men ever held in New York and every detail contributing to a thoroughly enjoyable dinner is being arranged by the various sub-committees. President Maclaurin will be our principal guest and we shall also have addresses from other men of prominence. Tickets at four dollars each will be mailed upon receipt of request for reservations addressed to "Dinner Committee, 17 Gramercy Park," and such requests should be sent promptly to facilitate the work of the committee in making seating arrangements.

Meanwhile members are enjoying the smoke talks at the club

house arranged by F. C. Schmitz, '95, chairman of the entertainment committee. On November 28th the good fellowship of the smokers was enjoyed by between 150 and 200 men when "The Bunch," furnished through the courtesy of Peerless Rubber Manufacturing Company, *Power and the Engineer*, Jenkins Brothers, Manning, Maxwell & Moore, etc., comprising six or eight talented entertainers, amateurs with professional ability, gave us a splendid evening of clever songs and stories which put and kept everyone in smiling good humor. A number of '10 men met that evening and thereupon planned for a class dinner which has since been enjoyed by fourteen members at the club house; '95 also had a pleasant class dinner there recently and the committee on class reunions in the December *Bulletin*, made the following announcement: "Any man of any class can start a dinner by obtaining at the desk a list of members and the stamp for notices and informing the house committee. The club is the place and the opportunity. Special dinners will be arranged on request."

On smoker nights the tables are generally engaged in advance and at the last smoker, forty-eight men dined at the club. The announcement for the December smoker, contained the following: "At the club house, Tuesday evening, December 20, 1910, at 8 p. m., Mr. Elmer A. Sperry will talk to us on 'The Gyroscope' illustrated by lantern slides and running models. We had a bully time at the last smoker and those who were not there missed something. Don't make it a double regret by missing this one. Come and see your old friends. They will all be there."

For the library committee, Floyd Taylor, '03, chairman, announces the nucleus of a reference library including text-books used at the Institute, for many of which, grateful acknowledgment is made to donors, and that new magazines have been added and the table is lined nightly with readers.

At the club, the house committee is maintaining excellent service and pool and bridge tournaments will soon be organized to compete for cups offered by the board of governors.

The annual meeting at the club house, February 4, when seven new governors are to be elected, will have a large attendance, especially as it is announced that the business of balloting and rendering reports will be enlivened by the "Plantation Darkies" who gave us such a jolly evening last spring, with songs and "infinite jest and merriment."

The membership box office is open and the glad New Year of opportunity is at hand. As was well said by the Technology Club of Boston in the last REVIEW, "If you are a member, come and use the house as much as possible. If you are not a member, application blanks may be obtained from any of the officers."—*William H. King, '94, Chairman Publicity Committee, 17 Gramercy Park.*

THE TECHNOLOGY CLUB OF THE MERRIMACK VALLEY.—The club is planning for a special observance at the annual meeting early in February, 1911, of the tenth anniversary of the formation of the society. Nothing definite has as yet been decided upon: it is very possible that President Maclaurin will be a guest of the club on that evening.—*John A. Collins, Jr., '97, Secretary, 67 Thorndyke St., Lawrence, Mass.*

Technology and Industrial Education

At the fourth annual convention of the National Society for the Promotion of Industrial Education which was held in November, Technology was well represented. The president of the society was Charles R. Richards, '85, director of Cooper Union, New York City. Among the speakers were Tracy Lyon, '85, assistant to the first vice-president of the Westinghouse Electric & Manufacturing Company of Pittsburg, who described the apprenticeship course of that company, and George M. Basford, '89, assistant to the president of the American Locomotive Company, of New York City, who described the apprenticeship system of the company he represented. Frederick P. Fish of the Corporation made an unusually able address at the banquet tendered by the Chamber of Commerce. Mr. James P. Munroe, '82, was elected president for the coming year. Among other Tech men who took part were Walter B. Russell, '97, director of the Franklin Union, Boston, and Arthur L. Williston, '89, formerly director of the Department of Science and Technology at the Pratt Institute, Brooklyn, and who has recently become the head of the new Wentworth school of Boston, and others.

EIGHTH MEETING OF THE ALUMNI COUNCIL

Discussion in Regard to Dues—Summer Camp of Civil Engineering Requires \$25,000—Committee on Congress of Technology

At this meeting held on November 7th, at the University Club in Boston, there were thirty-one members present.

The eighth meeting of the Alumni Council was marked by several informal discussions that took place and it was one of the most satisfactory meetings that the council has held. Much seems to be gained by these informal discussions.

A report made by the executive committee on the change in the form of the publication of the REVIEW was announced, and in place of the four magazine numbers it is to be published monthly for nine months during the year, beginning with the January number.

The executive committee reported that it is of the opinion that representation of classes on the council is of such a character that it cannot be delegated, but the committee respects the sentiment of any class or society that desires continuous representation.

The resignation of Major Briggs as a member of the advisory council on athletics was announced, and also the appointment of Dr. Allan W. Rowe to fill his place. The resignation of Major Briggs was accepted in view of the fact that he has consented to act as treasurer of the advisory council on athletics.

The formal thanks of the Corporation to the alumni for the Income Fund which has been received during the past five years was read and is printed elsewhere.

A report of the discussion of the financial standing of the association by the executive committee was presented. Considerable time was given by the council to this question and the suggestion that the dues be raised was seriously considered. It is the opinion of the executive committee that rather than raise a fund for the association among a few, it is far better to have the expenses paid from the smaller contributions of many. The committee

is of the opinion that the expenses of the association are appropriate and should not be curtailed in their respective directions. It is to be noted that during the past year only about 57% of the members of the association paid their dues. It has, however, been increased during the past three years from 38%. It is hoped that with the change in the form of the REVIEW and the spreading of Institute news and word about the work of the Alumni Association more quickly and more generally than has been possible a marked change in the percentage of those who pay their dues will be made. The matter of the financial standing of the association was referred back to the executive committee to report at the next meeting of the council.

Further report was received from the committee on the Congress of Technology, and a letter was read from President Maclaurin, and at his suggestion the present committee was asked to nominate three to represent the alumni on the general committee, which the President of the Corporation has been authorized to appoint. This committee, besides the President, who is chairman, is to have three members from the Corporation, three from the Faculty of the Institute and three from the Alumni Association. For the Alumni Association Messrs. Little, Fay and Robb have been appointed.

The committee formerly appointed to consider the establishment of a camp for the summer school of surveying made a special report of progress to the effect that a member of the Institute Faculty had been delegated by this committee to inspect the proposed sites for the camp. The committee now realizes that \$25,000 will be needed to establish such a camp, and at their request they were authorized by the council to raise, in the name of the association, among graduates of the courses to be benefited, the necessary money to start the work.

An informal report was received from the committee on engineering research and as the report contained no recommendations that could be presented to the Corporation, and because the council purposes to have each new administration free in the appointment of all such committees the report was laid upon the table and the committee excused.

The council adjourned to meet January 2d when the annual meeting will be held.

Those present at this meeting were as follows:—President, A. F. Bemis, '93; secretary-treasurer, Walter Humphreys, '97; members of the executive committee, William S. Johnson, '89; Charles F. Park, '92; George W. Swett, '03.

Latest living ex-presidents: Walter B. Snow, '82; Everett Morss, '85; Frank L. Locke, '86; Edwin S. Webster, '88.

Representatives at large: A. D. Little, '85; J. P. Tolman, '68; Allan W. Rowe, '01.

Class representatives: '68, Robert H. Richards; '81, John Duff; '84, H. W. Tyler; '85, I. W. Litchfield; '86, A. A. Noyes; '89, Jasper Whiting; '91, Charles Garrison; '92, Leonard Metcalf; '93, Frederic H. Fay; '94, S. C. Prescott; '95, A. D. Fuller; '97, C. W. Bradlee; '99, H. J. Skinner; '00, Ingersoll Bowditch for N. J. Neall; '05, G. DeW. Marcy; '08, H. T. Gerrish.

Representatives of local societies: Technology Club of Merrimack Valley, John C. Chase, '74; Technology Club of New York, Francis C. Green, '95; Northwestern Association M. I. T., Washington Society of the M. I. T., and Technology Club of Milwaukee, by I. W. Litchfield, '85; Technology Club of Rhode Island, E. B. Homer, '85.

WALTER HUMPHREYS, *Secretary-Treasurer.*

The Monthly Review

The REVIEW for February, although having the same size page as the magazine numbers, so that they may be bound together, will have larger type pages with double columns. There will be no departments and no class news as such, the class news being confined to the magazine numbers. Please understand, however, that anything of importance connected with the classes or local Associations should be sent in for publication in the current REVIEW, while it is fresh. By this we mean all news relating to class reunions, dinners, or happenings of importance to members of the classes. Each item of news will be given a separate heading.

Material for the February REVIEW should be received on or before the 15th of January. In case happenings are to occur a few days after this date, kindly let us know, so that we can reserve space and thus insure their appearance.

CLASS SECRETARIES REORGANIZE

New By-Laws adopted—To Co-operate with Council and bring Classes into closer Relations

A reorganization of the Association of Class Secretaries was effected at the fourteenth annual meeting held at the Technology Club, Boston, November 13. Since the Alumni Council was instituted many alumni activities such as commencement and reunion festivities and the publication of *THE TECHNOLOGY REVIEW* formerly undertaken of necessity, by the class secretaries as the only representative body of alumni, have been carried on by the Alumni Association under the direction of the council. A year ago the question was raised as to whether the Association of Class Secretaries should not be dissolved in view of the fact that the Alumni Council contained in its membership representatives of all classes and most of the local alumni organizations, and at that time a committee was named to report at the 1910 meeting upon the question of continuing the association. This committee consisting of Dr. H. W. Tyler, '84, chairman, Walter B. Snow, '82, A. F. Bemis, '93, Frederic H. Fay, '93, and G. DeW Marcy, '05, reported as follows:

The committee is unanimously of opinion that the association should not be discontinued, for the following reasons:

The existence of the association has in the past been abundantly justified by the results it has accomplished. Its organization has been simple, economical and efficient.

The Alumni Council will naturally be responsible in future for many matters which have been heretofore dealt with by the association. On the other hand there is ample work for both, and it seems to the committee entirely feasible for the two bodies to share this with mutual advantage, the council concentrating its attention on the larger questions of general policy, the association dealing with others. Matters not clearly belonging to one rather than the other might naturally be dealt with by joint committees. The council would refer appropriate matters to the association, and conversely.

Any possible conflict or duplication would be obviated by the fact that the two bodies would have a considerable proportion of members in common. On the other hand the larger classes would choose men of somewhat different type as their representatives in the two bodies. The best man for class secretary will

often not be the best man for dealing with the broader questions which come to the council. Both types are needed, and both should be organized.

The representation of undergraduate classes in the association seems to the committee an additional reason for continuing it.

The committee recommended changes in the by-laws which were adopted; in the main they consist of the elimination from the membership list of representatives of the Faculty and of the local alumni organizations, the latter now being given representation in the Alumni Council, and in the establishment of an executive committee to look after many details of the association's work in the interval between general meetings, the duties of this committee being similar to those of the executive committee of the Alumni Association. The following are the amended by-laws now in force:

Article I. Name. This organization shall be known as the Association of Class Secretaries of the Massachusetts Institute of Technology.

Article II. Object. The object of this organization shall be to foster and maintain closer relations among all Institute classes, to systematize all matters pertaining to organization and record, and to cooperate with the Alumni Council in matters affecting the welfare of the Institute.

Article III. Headquarters. The headquarters of the association shall be the Technology Club.

Article IV. Membership. The membership shall consist of the secretaries of all graduate classes, the president and the secretary of the Alumni Association, a representative of the committee on publication of THE TECHNOLOGY REVIEW, the secretaries of the four undergraduate classes of the Institute, and the president of the Institute committee. In case a class is without a properly constituted secretary a representative of that class shall be called upon by the secretary of this association to act as representative for said class until such class secretary is appointed. Any class secretary unable to be present at any meeting, shall appoint a member of his organization as his representative, and to said representative shall be accorded all the powers which would be exercised by the secretary if he were present.

Article V. Officers and Committees. Section 1. The officers shall be a secretary and an assistant secretary. The secretary shall also perform the duties of a treasurer. They shall be chosen by ballot at the annual meeting in each alternate year and shall hold office until their successors have been elected and have accepted office. In case of death or resignation of the secretary the assistant secretary shall immediately become secretary and shall hold the office for the unexpired term. The secretary, or in his absence the assistant secretary, shall call all meetings to order and shall preside until a chairman is chosen.

Section 2. There shall be an executive committee consisting of the secretary, the assistant secretary, and three other members. This committee shall have power to fill vacancies, and to act in general for the association to which it shall

make a report annually. The three members of this committee other than the officers shall be chosen at the annual meeting in each alternate year to serve for two years or until the election of their successors.

Article VI. Meetings. An annual meeting shall be held in November of each year. Other meetings may be called by the secretary, and must be called upon the written request of three members.

Article VII. Amendments. These by-laws may be amended at any meeting by a two-thirds vote of the members present except that no amendment may be adopted which has failed to secure at least seven affirmative votes.

The officers of the association, Frederic H. Fay, '93, secretary, and I. W. Litchfield, '85, assistant secretary, were reëlected for the ensuing two years term; and J. A. Rockwell, '96, N. J. Neall, '00, and R. R. Patch, '06, were chosen to serve with the officers on the executive committee.

The Institute's needs and the work of the legislative aid committee were set forth by J. W. Rollins, '78, chairman, H. W. Tyler, '84, secretary and A. F. Bemis, '93, of that committee; and after full discussion, in which many suggestions were offered for bringing the Institute's case to the attention of the legislators, the association voted to coöperate to the fullest extent with the legislative aid committee.

Twenty-five men were present at the meeting at which Prof. R. H. Richards, '68, presided.

Alumni have Contributed Generously

The annual report of the treasurer of the Institute shows a most encouraging condition from one point of view. During the past five years the alumni have contributed toward general expenses \$206,665.15. They have raised the Walker Memorial Fund of \$125,501.97 to be used for the building of a student social center, they have raised \$7,357.72 for an Improvement Fund, they have made the present Tech Union possible, and from time to time have contributed generously for other special purposes. Members of the Faculty have also been generous in furnishing the financial means for certain improvements in the various departments. This is the most certain sign of our strength as an educational power—the support and interest shown in the welfare of the Institute by those at any time connected therewith.—*The Tech.*

AMONG THE UNDERGRADUATES

The New Finance Committee has already worked Wonders— The “Tech” needs better Alumni Support—Tech Show Announced

The most important development in undergraduate affairs is the establishment of a finance committee, whose duty is to have general oversight of the finances of practically all the student activities in coöperation with the Institute committee. There are three alumni members and twenty-five, or more, undergraduate members, representatives of the various student interests. Two meetings of this finance committee have been held. At the first meeting each man present reported informally but fully on the present status and future prospects of the society he represented and after the last man had spoken and the last suggestion had been made by alumnus or undergraduate the members present realized what coöperation of this kind will surely mean to student activities at the Institute. Most of the reports were very satisfactory. It developed, however, that *The Tech* was not receiving the support it should have, either from the undergraduates or from the alumni. The men present agreed to form themselves into an active working committee to change this condition, and at the second meeting of the finance committee two weeks afterward a most encouraging condition of affairs developed. The status of every interest had been much improved and *The Tech* had greatly benefited by the team work that had been developed. The paper is now in a much healthier condition, and as a news organ it is probably not to be excelled in the college world. It ought to have at least a hundred more alumni subscribers.

The hockey team has started out with good prospects and in the match with the Harvard team, which is especially strong this year, the latter had to put its first rank men into the game and defeated Tech with difficulty by a score of 4 to 3.

The Institute has a strong basket ball quintet in the field with thirteen games scheduled. In the game on December 21 it beat

Boston College by a score of 46 to 35; on the 23d it vanquished the Brooklyn Polytechnic by 6 to 3, but met defeat at the hands of the College of the City of New York by a score of 4 to 3. The future games are with Dartmouth, Brown, Rensselaer Polytechnic, Union, Williams, Tufts and Wesleyan.

A swimming team has been organized and arrangements have been made to use the pool at the Brookline Gymnasium. Boxing has taken a new start under Eddie Shevlin, who has been appointed boxing instructor and who will conduct a class in calisthenics three times a week. A wrestling team has been organized which will be in the care of Coach Mathers, the New England heavyweight wrestling champion.

"Frenzied French" by Edwin C. Vose, '11, and Wellesley J. Seligman, '12, has been selected as this year's Tech Show. The play is an up-to-date two-act musical comedy, the scene of which is laid in the vicinity of Boston.

Technology and the Commonwealth

In forty-nine years the Institute has received from the Commonwealth only \$552,191.78 which can properly be charged to it,—an average of a little over \$11,000 a year. The Institute has expended to date about \$13,000,000 of which the Commonwealth has paid only a very small percentage. The expenses for the year ending September 30, 1909, were \$575,794.35, of which the Commonwealth paid \$25,000, besides the \$4,000 for scholarships. The sum received during that year from student fees—\$325,434.25—was not sufficient to pay the salaries of the staff, which amounted to \$428,420.27 (teachers, \$347,704.79). The expenses exceeded the receipts by \$29,819.51.

The state, in other words, bears less than 5 per cent. of the cost of the Institute's work, the students paying a little more than 50 per cent., past and present benefactors nearly making up the large remainders. This constant heavy drain on gifts and bequests which would otherwise be available for endowment retards the development of the Institute.

TECH MEN IN THE PUBLIC EYE

MR. H. J. HORN, '88, assistant general manager of the Chicago, Burlington & Quincy Railroad's lines west of the Missouri River, has been appointed assistant to Mr. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad. Mr. Horn will have charge of the operation of the steam lines of the New York, New Haven & Hartford Railroad and will do practically the same work that was done by Mr. John F. Stevens, formerly vice-president of the company. After Mr. Horn was graduated from the Institute in 1888, he entered the service of the Northern Pacific Railway as draughtsman, and winning his way step by step, through engineering, operating and administrative departments, he became general manager of the system in 1904.

JAMES P. MUNROE, '82, executive director of "Boston 1915" was elected president of the National Society for the Promotion of Industrial Education at the close of the fourth annual convention in Boston. He succeeds Charles R. Richards, '85, who was president last year. Mr. Munroe has just been elected second vice-president of the City Club.

C.-E. A. WINSLOW, '98, assistant professor of biology at the College of the City of New York, has been made a member of the advisory board of statisticians, which in connection with Dr. Ernst Lederle, commissioner of health of New York City, will endeavor to outline a plan for a better computation of health and mortality statistics.

FRANCIS H. MCCRUDDEN, '00, recently connected with the Institut der Universitäts, Würzburg, Germany, has been appointed chemist on the staff of the Rockefeller Institute for Research.

GEORGE E. HALE, '90, director of the Mount Wilson Solar Observatory, Pasadena, Cal., received the degree of Ph.D. at the centenary celebration of the University of Berlin. His was one of three honorary degrees conferred upon American men of science.

GARDNER W. PEARSON, 1885-86, has been appointed adjutant-general and chief of staff by Governor-elect Foss. Captain Pearson is a nephew and ward of Gen. Benjamin F. Butler. He is a member of the firm of Lowell, Lawrence and Washington, patent attorneys, with offices at Lowell, Mass.

HAROLD S. BOARDMAN, 1895-96, has been appointed dean of the college of technology of the University of Maine. He was graduated from the University of Maine in 1895 and after doing graduate work at the Institute, he took an engineering position with the American Bridge Company, afterwards returning to the University of Maine as instructor in civil engineering. He was made professor of civil engineering in 1904.

EDWIN H. BLASHFIELD, 1865-66, is a member of the newly-formed American Academy of Arts and Letters, known as the "American Immortals." After leaving the Institute, Mr. Blashfield studied in Paris under Leon Bonnat, also receiving advice from Gerome and Chapu; he exhibited at the Paris Salon, yearly, 1874-79, 1881, 1891, 1892; also several years at the Royal Academy, London; he returned to the United States in 1881; he has exhibited genre pictures, portraits and decorations. Among his paintings are "Christmas Bells" and "Angel with the Flaming Sword." He decorated one of the domes of the Manufacturers' Building, at the World's Columbian Exposition; Collis P. Huntington's drawing-room; great central dome of the Library of Congress; a decorative panel for the Bank of Pittsburg; the Lawyer's Club of New York; Astoria ball-room ceiling; library of the town house of G. W. C. Drexel, Philadelphia; the supper-room of the New York house of W. K. Vanderbilt; a decoration for the high Appellate Court of New York; ceiling and three lunettes in the Prudential Life Insurance Company's building, Newark, N. J.; he decorated a room in the house of Adolf Lewi-sohn, New York; court-room in Court House, Baltimore; two lunettes in senate chamber, state capitol of Minnesota; large panel in the state capitol of Iowa; decoration of the entire chancel of the Church of the Saviour, Philadelphia; decoration of four main pendentives of the dome of the new Court House, Newark, N. J., etc. He is a member of the National Academy of Design, also a member of the Mural Painters, Architectural League, etc.

He has been president of the Society of American Artists, and has lectured on art at Columbia, Harvard and Yale.

JOHN S. BLEECKER, '98, manager of the Columbus Railway Company, of Columbus, Ga., was recently elected president of the Georgia National Electric Light Association Section. Mr. Bleecker is the son of Rear-Admiral J. V. B. Bleecker, U.S.N., retired. On leaving the Institute he entered the employment of the American Bell Telephone Company where he remained until 1900 when he entered the services of the Stone & Webster Engineering Corporation, where he has since remained. He has covered a wide range of duties, from a lineman to manager in various parts of the country.

ALBERT SAUVEUR, '89, professor of metallurgy and metallography, at Harvard University, has been, perhaps, the most prominent figure in the development of metallography in the United States. He became interested in the newly-discovered science of metallography by Doctor Sorby of England, and in 1891 made a practical application of it in the laboratory of the Illinois Steel Company, in Chicago. In 1898 he founded *The Metallographist*, a quarterly review devoted to the science, which was made a monthly in 1904, and changed in title to *The Iron and Steel Magazine*. Professor Sauveur became connected with Harvard University in 1898 and was made professor of metallurgy and metallography in 1906. He was also a lecturer at the Institute from 1898-03. Largely through the results of his investigations, the microscope is in daily use in more than three hundred laboratories for the examination of metals.

GREENLEAF W. PICKARD, 1897-98, is the subject of an article in the series on American electrical engineers in the *Electrical World*. Having taken up the study of wireless telegraphy immediately after leaving the Institute, he made investigations at the Blue Hill Observatory in problems connected with wireless telephony for the Smithsonian Institution. In 1902 he joined the engineering staff of the American Telephone & Telegraph Company in charge of the investigation of wireless telephony. In 1906 he became consulting and electrical engineer with the Huff Electrostatic Separator Company of Boston, and the Wireless Specialty Apparatus Company of New York City, and has also

opened an office as consulting engineer. He is the inventor of many important devices in wireless telephony and telegraphy and has written largely for the technical press.

WILLIAM H. GERRISH, '88, has been appointed smoke inspector of the Massachusetts Gas and Electric Light Commission, following a competitive examination under the civil service requirements. Mr. Gerrish has had a wide experience as mechanical engineer and manufacturer chiefly along textile lines.

LOUIS K. ROURKE '95, superintendent of streets of Boston, has succeeded in effecting one of the most sweeping changes in the administration of municipal affairs in that city by securing the passage of an ordinance consolidating the engineering, water and street departments, all of which deal with engineering construction work into a Department of Public Works, of which he will have charge as commissioner. In the half year that he has been at the head of the Street Department Mr. Rourke has won the confidence of the people of Boston who find in him a strong, capable, business executive.

In eliminating politics and reorganizing the engineering construction work of the city on a broad business basis, Mr. Rourke is merely applying the scientific methods of administration learned in his experience which has been an interesting one. Immediately after graduating from the Institute in 1895 he began his active engineering career as a section hand on the Boston & Maine Railroad where he remained for two years in different positions rising to that of assistant roadmaster. Then came an opportunity to go to Panama where for two years he was supervisor of track of the Panama Railroad; this being during the French régime, when sanitation on the Isthmus was an unknown luxury. Life in the tropics apparently had no terrors for Mr. Rourke for the next five years were spent in railroad contracting work and management in Ecuador, Mexico and Chile, until 1904, when he returned to Massachusetts, formed a partnership with his brother, and as contractor built some portions of the state highways. Late in 1905 he was asked to go again to Panama, and he entered the service of the Isthmian Canal Commission, holding various positions as supervisor of construction, then superintendent of tracks and dumps, assistant division engineer and acting division engineer of the Culebra Division.

While holding the latter position three years ago, he effected a complete reorganization of the work of the Culebra Division which proved so successful that later his plan of organization was adopted for the entire canal, and he himself was directed to organize the Central Division, thirty-two miles in length out of the fifty miles of the canal, and comprising nearly all of the dry land excavation, including the famous Culebra Cut, nine miles long. Under the direction of one of the Canal Commission, Mr. Rourke was placed in charge of the Central Division having direction of a staff of 12,000 men and an annual pay-roll of \$6,000,000. This position he held for two years, until he resigned to come to Boston. That Mr. Rourke is a man who has done large things is evident from the testimony of those high in authority, including the President himself.

ARTHUR L. WILLISTON, '89, formerly of the Pratt Institute of Brooklyn, is the head of the Wentworth Institute now being erected opposite the new Museum of Fine Arts in Boston, which will probably open its doors to students next fall. After being graduated from the Institute Mr. Williston became connected with the faculty of the Ohio State University. He has had engineering experience with one of the Western railroads and was a member of the commission which established the Carnegie Technical Schools in Pittsburg. At the Pratt Institute he was director of the department of science and technology for twelve years.

SOME TESTS OF ACADEMIC EFFICIENCY

Quality of Product a Controlling Factor—Character and Ability of Teachers all-important—A grave Oversight to ignore the Spirit and Method of Teaching

The recent publication by the Carnegie Foundation for the Advancement of Teaching, of the report of Mr. M. L. Cooke on the efficiency of the conduct of the physics departments of several institutions of learning gives us opportunity to print a part of President Maclaurin's address delivered at the dedication of the engineering laboratories of the University of Kansas last February, when the advance sheets of this report appeared.

. . . Now it seems to me that in the process of striving to raise our standards we are a little apt to slavishly copy what other people are doing without clearly recognizing why we are copying them and what we are striving to attain. One college opens a new department in some sphere of activity; another thinks it is bound to do the same thing, although the local conditions may be totally different. If one school of engineering establishes a new course another is sure to follow with a similar course. We need a measuring rod to determine whether our level is above or below our competitors. How are we to reach a real standard of efficiency? How are we to know whether our institution is better or worse than some other institution? Of course various standards have been suggested. The great objection to most of them is that they are too mechanical. The best part of any educational institution is a spiritual thing and a spiritual thing must be spiritually discerned.

Now one of the institutions in this country which is doing its best to carry out a leveling process and trying to raise the institutions of the country is the Carnegie Foundation for the Advancement of Teaching. Its course is so brief that none here can have missed the opportunity of following it. Founded only a few years ago by Mr. Carnegie for the avowed purpose of pensioning professors who had long served their country as teachers and investigators, it is being put by those who have managed it to a quite different purpose and that purpose is to standardize our institutions.

I am not going to discuss what the foundation has done or is doing, but I should like to refer to a report, the advance sheets of which the Carnegie Foundation has just issued, under the title "A Comparison of Academic and Business Efficiency." The fundamental idea that suggested the drawing up of the report is one that must attract us all. It was to obtain a report on the efficiency of different educational institutions looked at from the viewpoint of a business man. To this end the foundation employed the services of an accomplished engineer, Mr. Cooke, and asked

him to report on a number of educational institutions in this country. He was instructed to employ the same methods in his investigation that he would if he were reporting on the efficiency of a cotton mill or an automobile factory. To simplify the problem he was to confine his attention to eight institutions; to further simplify it he was to deal with a single department in each of these institutions; that department happened to be the department of physics. The report is a lengthy one—those of you who are interested will doubtless read it for yourselves—but I may just sketch with extreme brevity the fundamental guiding principle.

Mr. Cooke begins with the truism that if you are to test the efficiency of a factory from a business point of view you want to know the cost of the working of the machinery. He therefore proceeds to discuss how much it costs to train men in physics in these different institutions and sets up a standard of measurement of what he calls the "student hour," the cost of teaching a student the subject of physics for a single hour. After an elaborate system of figures and a great deal of computation he discovers what is supposed to be the cost of teaching a student in physics for one hour in Harvard and Boston Tech, and these different institutions. Now whether his figures really represent the cost or not is questionable, but there can be no doubt that they do not gauge the efficiency of the institutions under consideration.

The efficiency of an automobile is not gauged by its cost, and certainly the efficiency of Harvard or Boston Tech is not gauged by their cost. You must of course look to the product. Now a man of Mr. Cooke's acumen could not overlook so obvious a fact, although he passes it over with almost unpardonable brevity in a report that professes to deal with the question of *efficiency*. He does not always seem quite true to himself. He tells us in one place that "the cost per student-hour has absolutely no value in distinguishing relative educational values." Elsewhere he says "certainly some idea of quality will be gained by simply knowing the cost." However, he does recognize that the *quality* of the product must be tested before we have any real gauge of efficiency, but when it comes to suggestions for a test of quality he formulates a plan that a serious educator could regard only with laughter or with tears. Here it is—let us establish a central bureau to which may be submitted the examination papers and the answers from the five highest and five lowest students, and let the central authority assign marks for the difficulty of the questions and the rigor with which they were answered. I shall not presume upon your patience by pointing out to what abuses such a plan would be exposed, nor how paltry a contribution it is towards the solution of an extremely important national problem. I should like, however, to call your attention to various matters to be kept in view when we set out on the task of testing the efficiency of any educational institution.

I would remark at the outset that the matter is extremely complex and that no wise man would even dream of giving a *numerical* measure of the efficiency of Harvard or the University of Kansas. He would no more do that than he would say that the efficiency of his friend Jones is 62, and of Smith is 55. On the face of it, such apparent accuracy is ridiculous. But we do want to know in a general way how we are to gauge efficiency, and I need only sketch the process which is a fairly obvious one. The natural way of attacking the problem would be to attack it directly. We are interested not in the machinery but in the product. The obvious procedure would be to examine the product in the different institutions and see how

they stand relatively to one another. We would have, of course, to set out with some fundamental conception of what all of these educational institutions are striving for. Unless we agreed about that we could not possibly agree as to their efficiency. Fortunately, there is general agreement today that the aim of all educational institutions is a social one. The University of Kansas, and Boston Tech and Columbia University and all the rest are striving to this great end—to train men to serve the state intelligently, honestly and effectively. We are all attempting that. To what extent do we succeed relatively to one another?

Now, the natural process, I say, would be to examine the product of these different institutions and see whether men coming from these different institutions have "made good." This, however, is no easy matter where there are thousands of men to be considered and the gauging of the social efficiency of a single man is so difficult and delicate an operation. And then, you have to remember that the "making good" by an individual may have really little to do with the educational institution in which he has been trained. I had the honor of being brought up in the English University of Cambridge, which has been spoken of by a poet as a "nest of singing birds," for the reason that that university has produced, if I may use the term, an extraordinarily large number of great poets. But no one seriously suggests that the poetic power of Tennyson or Wordsworth had much to do with his training in the University of Cambridge. And so it is with the actual making good of a great many of our leading men; in most cases it is only indirectly due to the training they received in the university. Then you must bear in mind that an extremely important factor in the making of good flour is to have good grain, and that one institution might be as efficient as another, but yet for the lack of good grain not turn out so fine a product. Thus you would have to gauge not only the graduate, but the men at entrance, and this would greatly complicate the problem. Practically, then, I think, you would have to proceed indirectly by carefully examining the means that were employed in the institution to produce the results. If you bore in mind the idea of social service as a thing toward which we are all striving, you would have to begin, I suppose, with some estimate of the relative social value of a college education and the education in a professional school, taking each at its best. The aim of a college is to train a man broadly and so develop every side of his character that he can devote himself to the duties of citizenship in whatever special sphere of activity he can be most effective. The professional school does not neglect breadth of outlook or the duties of citizenship, but it bends its powers to the education of men for the service of society through the medium of definite professions. To gauge the relative value of these two schools you would need to decide whether it was more important to have an alert, broad-minded man with no professional skill, or a man who could set your leg if you broke it, or bridge the Mississippi if you wanted to cross it. It would be an extremely difficult question to decide, but you would have to do it somehow if you wanted to solve this problem numerically. Then if you confined your attention to professional schools you would need to estimate the relative value to the community of a doctor, lawyer, clergyman or engineer, and so on. In doing this you would necessarily take into account local needs and local peculiarities. You would have to consider, as a single sample of what I mean, whether there was a real demand in the community for an increased number of doctors, and so with the other professions.

Here today we are celebrating the foundation of buildings which are to be devoted to science and its applications, and so it would seem natural to consider that kind of educational effort somewhat more minutely. You would have to begin with deciding on the usefulness to the community of an education such as is being given in this institution, and in particular in this school of engineering where men are trained in the sciences for the service of the state. Now, it is such a commonplace today that science has revolutionized the world that I shall not weary you with attempting to demonstrate that fact. At the same time I should like to say in passing that, like many another commonplace, it is too often neglected in actual practice. It seems that individuals and states in making provisions for education constantly fail to recognize how enormously important to the welfare of the state it is that men should be trained in science, and in its application to every branch of practical life. We live in an age preëminently scientific, and if we are not able to cope with a problem scientifically we can not cope with it at all. But not only is a scientific training essential anywhere to any country today, it is, I think, peculiarly important in this country at this particular time. It seems to me that one of the great dangers of our democracy is the prevalence of the idea that one man is as good as another. It is an idea founded on an erroneous theory of democracy and one that appears utterly false from a scientific point of view. It too often gives support to the doctrine that any man will do for any position that he is clever enough to get. Nothing has surprised me more in moving about this country than to see countless instances of men who have had no adequate scientific training employed in the service of cities and of states, to do work that really needs a very considerable scientific equipment. They are amateurs doing the work of professionals. We have suffered too much at the hands of these amateurs, and we must remove them—root and branch. We must educate our communities in such a way that it will shock their moral sense to see a man, let us say, administering a department of public health who knows little or nothing of biology and bacteriology or any of the other fundamental sciences that enter into the very heart of his work. Then we have to bear in mind that this nation is peculiarly given to extravagance. This is due largely to the optimism of the American people, a quality on which so much of America's success depends. But it has its drawbacks, like other good things, and the spirit of extravagance may yet drive us upon the rocks. We must not forget that conditions are rapidly changing and that what might suffice for a past generation will not do today. A generation ago we could speak of our natural resources as practically unlimited, now we begin to see their end—at least in some directions. And apart from this we must recognize that under any circumstances *waste* is a sin and that the record of progress is largely the record of the elimination of waste. We shall have to make up for the diminution of our natural resources by new applications of science which will make ten blades of grass grow where one grew before, and by new inventions which will save 50 per cent. or more of the waste in most of our industrial processes. However, even without any new inventions we could easily make enormous savings by the proper use of the existing knowledge. Let me give you a single example. A few years ago a graduate of the Massachusetts Institute of Technology, trained in the department of biology, was appointed to an administrative post in one of the great cities. He invented nothing new, but merely joined common sense and executive ability to the scientific knowledge that his training at Tech had given him. Before long he had given the city a much

better service than it had ever had before, and at the same time had *saved it more than a million dollars each year*. Suppose you multiply the million dollars thus saved by even a very small fraction of the thousands of men trained each year in the scientific institutions of this country and you may form some estimate of the saving grace of such institutions and of their value to the community.

I think, then, that there can be no question that you would have to put in a very large factor of usefulness, if you were estimating the value of such an educational institution as we are considering today—at least if you realize in any adequate degree the importance of scientific knowledge in public and private life. And, of course, a not unimportant element in such scientific knowledge would be a knowledge of physics, and under ideal circumstances this knowledge might be at least partially tested by Mr. Cooke's method, to which reference has already been made. It would, however, at best be only a partial test of knowledge, and it would neglect a great many factors of the first importance. May I remind you that *knowledge* is very far from being everything and that much of our educational work today and in the future must be to deliberately *smash up the idol of knowledge*. We are peculiarly prone to this form of idolatry in a scientific school, for science rightly lays a great stress on facts and their accurate apprehension. We are very apt to overestimate the value of such knowledge, and it is because we have done this so much in the past that there has been so much disappointment in many quarters over the results of scientific teaching. It is a fact that water is composed of oxygen and hydrogen, and it is the knowledge of such facts that is tested by such examinations as Mr. Cooke proposes. But, except to a very few, such knowledge profits little or nothing—what is infinitely more valuable is an understanding of the method by which the facts are reached and an appreciation of the spirit that compels their investigation. Here, as elsewhere, it is the spirit that giveth life, and any test of efficiency that ignores the spirit and deals only with the bare fact is a mockery.

It would be a monstrous oversight to ignore the method and the spirit of the teaching. Are the pupils trained by a mere grind over knowledge, a mere hammering in of facts—enough perhaps to ensure that they reach the requisite 50 or 60 per cent. in Mr. Cooke's examination? We must all know schools that would appear to be highly efficient from such a test, and which are really extremely inefficient; and on the other hand some of our best institutions might not make a very good show when subjected to Mr. Cooke's scrutiny. At the Boston Tech a method has been in vogue for long that there is deemed highly satisfactory—it is known as the "do-it-yourself method." The students are put as much as possible upon their own resources and learning is not made easy where it seems better for a man to experience the apparent hardship of overcoming a difficulty for himself.

Then, when considering method, we should want to know whether the students are taught to master fundamental principles, or to spend most of their time over details or particular examples. Is it made manifest to them that the details of practice are constantly changing, that what is good in that respect today may be antiquated tomorrow, whereas fundamental principles, like the brook, go on forever?

As to the spirit of the teaching—is it possible to overlook the character of the teachers? Are they men who understand the depth and breadth of their calling? Do they take a large view of the life of today, and have some prevision of tomorrow? Are their circumstances such as to make this larger outlook possible or probable?

Are they narrow specialists or broad-minded, far-seeing men? Are they paid so that a reasonably full life is a possibility, or are they so ground down by poverty that they must give most of their thought to the vexed question of the cost of living?

Finally, is a successful effort made by the teachers to convey their largeness of view and breadth of outlook to their pupils? Do the students learn to understand that science does not affect mankind merely on the material side? Do they see that all the changes that science has brought about necessarily involve a profound mental and spiritual change—a change, so great, indeed, that it is well-nigh impossible for us thoroughly to sympathize with our grandfathers? Do they realize that science has thrust us into a new world and that our new surroundings have made us new men? Unless they appreciate this they can not be in real communion with the life of this age. They must live more or less apart, and move away from the great current that is sweeping the world along. Like Bernard Shaw, they must find that they were born in the seventeenth century and that they have not yet outlived it.

I might express this last test of efficiency otherwise by saying that you must look to the *cultural* element in the teaching of science—but I am afraid of the word “culture.” It has been so terribly abused. Some speak as if the test of culture were the knowledge of Latin, or of Greek, or of French literature, or of Italian painting, or of what not. As a matter of fact it is none of these things, for I take it that the root of culture in any worthy sense of that word is *the possession of an ideal that is broad enough to form the basis of a sane criticism of life*. I hope that I need not turn aside to demonstrate the competency of science to present such an ideal. I willingly admit that some such ideal may be reached by various paths, through the study of literature, or of art, or of science. I should be the last to suggest that these are rival or mutually exclusive pursuits or that any one can justly claim a monopoly of culture. To know the best that has been said in literature and to use this as a touchstone in the criticism of the life of today, or to reach through art the ideal of perfection in form and color and make this broad enough to embrace life as a whole—each opens a promising avenue to culture. But how can a criticism of life be broadly enough based today unless the main results of scientific investigation lie at its roots and the method and the spirit of science be in the atmosphere that surrounds it? It can not, I think, be broad enough, unless we greatly exaggerate the part that science has played and is playing in the modern world. And I do not think that we exaggerate it, for practically all must recognize that there are few important problems of life today that science does not touch and touch most closely. This being the case, can a school be declared efficient that fails to give its students a vision and a grasp of the scientific ideal—an ideal that will guide them in the solution of all the complex problems that face individuals and face the state?

MISCELLANEOUS CLIPPINGS

The Kilauea observatory, which was proposed by Professor Jaggat about a year ago, is now certain to be established, according to Territorial Forester Ralph S. Hosmer, who has been in this city and the vicinity for the past ten days. The money for the work is already in the hands of the Massachusetts Institute of Technology, which will have charge of the undertaking, or has been subscribed by Honolulu people, and eleven cases of the most delicate seismographic instruments are now in the Honolulu customs house awaiting the arrival of Professor Jaggat, who will make a personal trip to Hawaii to take charge of their installation.

About a year ago Professor Jaggat, who is one of the best-known earthquake experts in America, visited Kilauea and at that time took up with a number of Honolulu people the matter of locating an observatory near the crater. L. A. Thurston and J. F. Morgan were among those interested and through their efforts enough money was promised in that city to ensure a fund of \$5,000 per year for a term of five years, Professor Jaggat stating that in addition to this amount he would be able to secure money from the Massachusetts Institute of Technology for the purpose.

Mr. Hosmer received a letter from Professor Jaggat shortly before he left Honolulu, in which he stated that within a short time eleven cases of the finest seismographic instruments which could be procured would be shipped to Honolulu, care of Mr. Hosmer, for the new observatory. In addition to this he stated that he would come out personally, just as soon as he was able to spare time from his work, and would superintend the construction of the necessary building and the installation of the instruments.

It is understood that an assistant professor of the Boston Tech will be placed in charge of the observatory when it is completed and that either Professor Jaggat, or Professor Daley, his assistant, will make frequent trips to Kilauea to watch the work which is to be done. The Bishop estate has promised to furnish a site for the observatory, which will be located on the edge of the steep bluff near the Volcano House.

In addition to the observatory proper it is planned to have a museum room, to which visitors will be admitted and which should prove of great interest. The seismographic instruments will be on exhibition there and this should prove quite an attraction to tourists and also to local people.

Before Mr. Hosmer left Honolulu the instruments had arrived and the matter of passing them through the customs house had been turned over to a customs broker. They come from Japan, where it is understood that they were made under the personal direction of Professor Omori, one of the greatest authorities in the world on earthquakes and the instruments used for recording such phenomena. As a matter of fact it is generally conceded that the Japanese are foremost in the entire world in their studies on this subject. For over sixty years they have been

watching the tremblings of the earth and keeping careful records.—*Hawaiian Star*, October 19.

The College Aëro Clubs are once more at work, however futile that work may be. The great trouble seems to be that the youthful projectors as a rule believe that they can build a real flying machine of their own design, and remain sublimely indifferent to the practical types which are making flights daily. How much better it would be for beginners to begin their experiments by taking a real flyer and attempting to improve upon it, instead of boldly starting out at the very beginning, and going toilsomely over the ground already covered. Should they follow the suggestion there really might be a field of usefulness for academic organizations.

But they have a far greater opportunity for securing data valuable to the development of the aëroplane. Even today, when flying has been an accomplished fact for several years, there remains much to be discovered as to the supporting power of planes of different curves and at different speeds. Here is a chance for laboratory work, which, after all, is where the student should shine. Some of the college institutions already realize this fact, and are really doing something which counts. Among these may be mentioned the Technology club, which is fortunate in having near at hand such an authority as Professor Lanza. The professor has already done considerable work with plane surfaces, in connection with some of his students, and is in a position to do still more.

But in building original machines the college men will never accomplish much. It takes too much money, too much time, and it is altogether too risky.—*Boston Transcript*.

The direction of the Department of Physics suggests similar or even greater possibilities in the field of aviation. There is at present perhaps no study so much in need of the aid that could be given to its theories as is that of aëronautics. What with the rewards, in fame and monetary prizes, that attend sensational flights at public contests, and the desire to make flying practicable for commercial purposes, inventors and aëronauts have but too easily been tempted to neglect the theoretical side of aviation, and have thus not only retarded progress in the art, but in some instances have actually come to an untimely, and what might have been an avoidable, death.

By their own initiative a number of students at the university have made creditable experiments in the use of air-planes, and, with no reward other than the pleasure the work affords, have shown that genuine and spontaneous enthusiasm is the necessary motive force in pushing any inquiry to great scientific results. Such energy, however, and such initiative need guidance. It would be fatuous, perhaps, to expect any startling achievement from such slight beginnings. But an enthusiasm of this kind, too rare we fear among students today, should receive every encouragement that mature and authoritative study can give it. Recognized by the faculty, such efforts would at once attain to the dignity of serious experiment. Much can be done, for example, in studying and comparing the structure and merits of various kinds of air craft; in collating the experiences of aëronauts, and in collecting reports of flights and contests in different parts of the world. The nature of air-currents and of their deflection by mountains and other natural obstructions is one of many possible inquiries. That some such a course

is needed has already been recognized by one of the leading scientific institutions in America. The Alumni Association of the Massachusetts Institute of Technology is at present raising funds to establish a course in aviation, and to purchase apparatus for producing air-currents powerful enough to be used in experiment. Certainly the effort is in the right direction. If the air-ship is destined in the future to make war, both on land and sea, as futile as it is now ridiculous (of which Mr. Moisant, the distinguished American aviator, seems assured), its development merits every aid that science, as well as wealth, can give. Moreover, from the student's point of view, we venture to say that the science of aviation, even though it may not afford to humanity the great benefits it promises, is a subject which, in its appeal to the imagination and as a stimulus to original investigation, will prove a worthy rival of any of the humanities.—*Old Penn.*

The provision of facilities for the practical training of technical graduates in public utility organizations is constantly growing in favor among progressive administrators. It is well that this is so, for the problems of management are today so complex, the intricacies of traction, lighting and power systems are so great technically, and the cost of mistakes in executive judgment so far-reaching, that means must be devised to give the graduate as wide an acquaintance as possible with the routine tasks which maintain the service and a first-hand appreciation of the dependence of the entire organization upon the economical use of labor and materials. However broad may be the training of the technical institution from which the future engineer or executive steps forth into the world of business, it is next to impossible to acquire during the undergraduate years that familiarity with the rough, raw materials of production and the influence of personality upon labor costs and accomplishments that differentiates commercial life from the secluded comfort of the laboratory. In many of the great arts upon which civilization leans today it is no longer possible for a man to "grow up with the industry." The development of electric traction, for example, has progressed so far that only the exceptional personality can hope to begin at the bottom and attain the higher executive positions. Other things being equal, the man of broad education along technical lines is needed to administer the great properties. He must start technically where older men trained in the school of experience stop, and the lack of practical training in the field must be supplied on the intensive principle.

In a typical course of training of this character the technical graduate secures a position with the company through the regular channels of employment, and after passing the regular examinations as to physical and mental fitness without disclosure of his ultimate purpose, he is set at work on the cars, becoming a regular conductor and then a motorman on a distant division. One or two of the higher officers of the company, acquainted with the aims of the course, follow the graduate industrial student's progress through some three years of temporary service in the various departments, including car house and shop work, line and track maintenance, emergency service, overhead and underground construction, power house operation, including testing, wiring, inspection, oiling, switchboard service and stoking. The course provides for service in the clerical and stock departments and brings the employee taking it into personal contact with the difficulties and time required to string feeders, solder cables, handle heavy bus-bar and switchboard connections, work with tools on relatively inaccessible equipment parts

from awkward positions, and to clean out boiler tubes, replace burned parts, maintain pumps and motors. Other practical tasks included are the preparation of pay rolls, testing of coal, water and draft, rewiring cars, connecting controller equipment with motors and rheostats, work in the purchasing bureau, preparation of timetables, handling of correspondence, installation of compressed air equipment, maintenance of trolley wire and snow-plow service.

At the conclusion of the course the student employee may not be an expert manipulator or workman in any of the branches covered, but dexterity is not the object of the training. If the best use has been made of the time, and there is little chance of anyone's spending three years in such post-graduate school of hard knocks without turning every week to excellent account, the man completing the rounds of departments should possess as good a preparation for future executive work of larger or smaller range as can be imparted by seven years of theoretical and practical training. By some such means will have to be recruited many of the industrial officers of the future.—*Engineering Record*.

Technical college instruction was discussed briefly in the presidential address of Mr. Alexander Siemens before the Institution of Civil Engineers on November 1. He pointed out that two definitions by Aristotle were too often forgotten. The first of these is: "Science is the trained faculty of demonstrating necessary conclusions from necessary premises, and these conclusions are independent of the producer." The second definition is: "Art is the trained faculty of producing, involving sound reasoning; it has to do with the genesis, the production, of things, and the result depends on the producer." From these definitions it directly follows that every profession must have its "science" on which its "art" is based, and for success in either training is necessary. Mr. Siemens holds the opinion that these very old and very true definitions show clearly that the engineering college training should deal principally, though not exclusively, with "science," viz., the natural laws which are "independent of the producer," leaving the "art" of engineering to be developed by practical work either in the field, in the drawing office or in the workshop. This thought is respectfully submitted to the particular attention of the Western college which announced a couple of years ago that one of its special facilities for teaching electrical engineering was a new and complete system of call bells installed in its main building.—*Engineering Record*.

Current Harvard statistics, showing that public schools are a more effective nursery of scholarship than private schools, do not, of course, apply to Boston alone, and they are interestingly supplemented by the report of the president of the Massachusetts Institute of Technology, which indicates that graduates of the Mechanic Arts High School, the natural "feeder" for Tech do not take high rank at that institution. It would be hardly fair to indulge in generalizations on the basis of either statement. Hitherto high schools that draw from the whole city have stood well in public estimation — much better, indeed, than some of the district high schools, where the idiosyncrasies of a principal or the pettiness of a controlling group of teachers has caused instruction to degenerate into dull and uninspiring routine. The mildest demand that citizens should make, in view of President Maclaurin's statement, is that the weak points in all be sought out and strengthened unsparingly. So few children, comparatively, go beyond the

elementary schools, and so much money, proportionately — or disproportionately — is expended upon the high schools that if these latter institutions cannot clearly demonstrate their efficiency for classical or technical or business preparation it is time that they should be put in position to do so.—*Boston Transcript*.

In its recent investigations on the teaching of physics, the Carnegie Foundation measured some American colleges by counting-house standards and found them wanting. That is not altogether surprising; the same would doubtless be found true of the churches, hospitals, and divers other eleemosynary institutions of the land were a like test applied. If it should turn out to be otherwise one might reasonably infer that churches and hospitals were devoting more attention to their profit and loss accounts than to the cure of souls and bodies. But we live in the heyday of the statistician, and these institutions, like all others, must gracefully permit him to take their measure. Yesterday we had university instruction reckoned in terms per "student-hour," tomorrow we may have religion tabulated in terms of cost per brand snatched from the burning.

Now all this is helpful enough in its way, and some of the results disclosed may perhaps point the road to improvements in the methods of college accounting, or in the forms of treasurers' reports. But it is very easy to press these counting-house analogies to the point of absurdity. A minimum cost per ton-mile, for example, may be the best evidence of railroad efficiency; but the university which aims only to provide instruction at a minimum cost per student-hour will certainly, in the course of time, find very few students to instruct. It might almost be said that the quality of college instruction varies in inverse ratio to its cheapness. Measured in terms of cost per student-hour, it is probable that Oxford and Cambridge would make a sorry showing; for they have many professors who draw a whole year's stipend for six lectures delivered to a dozen students. But even at that, when the instruction was given by Huxley, or Kelvin, or Acton, it was doubtless worth the price. And for that matter our own Mark Hopkins, at the end of his log, will probably continue to rank as a laborer worthy of his hire, even though his teaching, when duly analyzed by certified accountants, should prove to have been imparted at a rate above the normal margin of cost.

Statistical computations of the sort undertaken by the Carnegie Foundation do not, therefore, form a very safe basis for conclusions. That is not to say, however, that they are without their value. If nothing else, they will serve to make the college authorities more watchful, more energetic in the curtailment of waste, and more attentive to the multitude of details which affect instructional efficiency.—*Boston Herald*.

Will you please give me some information on manual training in our schools? When was it first introduced?—E. C. O., Foust Hill, Mich.

Manual training is the training of the hand in the use of tools and in practical drafting, as a part of a system of general education. In 1877, a manual training school in connection with the Massachusetts Institute of Technology was founded, and, 1879, the St. Louis (Mo.) Manual Training school was established. In 1884 schools were established in Chicago, Baltimore and Toledo, and in the following year one was established in Philadelphia. At the present time manual training is a part of the curriculum in every agricultural and mechanical college in the United States.—*Toledo Blade*.

Columbus, Ohio, boasts that it receives more pay for the by-products of its garbage treatment than any other city with a reduction plant. It has for superintendent of garbage collection a graduate of the Boston Institute of Technology, who works for \$100 a month for the experience, having had much better offers elsewhere. He has studied the problems which this new civic enterprise presents and has made himself popular by seeing that collections are regularly made.

In Buffalo collections are made regularly enough, but wagon men seem to think sometimes that a trail of refuse along the walk from rear to front is necessary as a sign that they have called. If the Columbus man has remedied this one defect in the service, he is earning his pay.

The use of reduction plants, with the attendant manufacture of by-products, is spreading slowly. Economic treatment of garbage is a subject of which cities appear reluctant to take hold. There are examples, however, of plants which pay, and plants which might not return a profit would, at least, reduce the cost of the service.—*Buffalo Express*.

It is nothing new to hear that the worthy institution popularly known as "Tech" is experiencing a financial crisis. That crisis, as a matter of fact, has existed for years; and it is unfortunate for the institution, and not at all creditable to the community or to the country that this should be so.

"Tech" men and "Tech" methods are honored the world over. Some years ago, when England was considering the problem of technical schools, a distinguished man of affairs was sent to this country to see what could be learned, and he reported finding the Massachusetts Institute of Technology the best school that had come under his observation. Graduates of the institution have been called upon to help solve some of the greatest engineering problems of the times. They assisted President Taft in his final consideration of the Panama Canal problem. They are doing invaluable work right here in Massachusetts—work that redounds to the credit of the Commonwealth as a whole.

The institution has been in the forefront in its special sphere ever since it was founded, but to keep it there has been an exhausting and discouraging task. This is exactly the situation that exists today and we trust that the plans to relieve "Tech" of its embarrassments will be successful. Success was never more richly deserved than in this particular case.—*Boston Journal*, December 25.

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NEWS FROM THE CLASSES

1868.

PROF. ROBERT H. RICHARDS, *Sec.*, Mass. Inst. of Tech., Boston, Mass.

Prof. Robert H. Richards spent Christmas in his native town, Gardiner, Me., where he visited his brother Henry Richards, who was an architectural student at the Institute in the early days. He also visited his brother General Richards who is commander of the National Soldiers' Home at Togus, Me., and his cousin Robert Hallowell Gardner, who is the present owner of the Gardner mansion where he was born.

The secretary is in receipt of a long and interesting letter from Andrew H. Russell, who has been roaming about Europe for three years and who was in Switzerland when he wrote. Just before retiring from active duty in the army in 1908 he started out for a change of scene and to avoid the tedium of finding himself with nothing to do in a place where he had been formerly actively employed. One of the entertaining parts of his letter is a description of a visit to Biskra, so familiar to those who have read Hitchens' "Garden of Allah." Russell has been very desirous of spending a winter where it is "always mild and dry" and had been looking forward to this trip with fond anticipations. These anticipations were not fulfilled as the season was an unusually cold one. There was snow in the mountains and rain in Biskra, but although disappointed in this respect he found much to interest him there, both on the edge of the desert as well as to and fro among the passes of the Atlas Mountains. The details of this trip, as he pictures them, make charming reading. The chronicle of his experiences in the Mediterranean countries raises a strong wish that one might have been with him. His description of Milan as contrasted with other cities of Italy, and, in fact, of southern Europe, as well as of the Milan he knew thirty years ago, is hardly to be excelled. Russell refers to the high honor that has been given to his classmate Brig.-Gen. W. H. Bixby, who is now chief of the corps of engineers of the army. He expresses his great interest in Technology and regrets that he could not have been with his classmates at the reunion of 1909.

1877.

RICHARD A. HALE, *Sec.*, Lawrence, Mass.

William D. Hartupée, second vice-president of the Pittsburg Plate Glass Company, and one of the most widely known plate glass men in America, died at his home, Hotel Schenley, Pittsburg, Pa., at 11.45 o'clock Thursday night, September 23. Death was caused by a stroke of paralysis, the second stroke in three months. Mr. Hartupée had partially recovered from the stroke he sustained in June, and had resumed work at his office.

Mr. Hartupée was born in Pittsburg, where he lived all his life. He received his education at the Western University of Pennsylvania, later going to the Boston School of Technology, and still later he studied mechanical engineering at the University of Carlsruhe, Germany. Returning from Germany, he became associated with his father, Andrew Hartupée, in a machine shop and foundry, the works being situated at Ferry Street and Third Avenue. During the Civil War many cannon for the Federal army were cast in Hartupée's works.

In 1890 William D. Hartupée became interested in the manufacture of glass and was instrumental in forming the Charleroi Plate Glass Company. He filled the offices of manager and engineer of that company until its absorption by the Pittsburg Plate Glass Company. His rise to eminence in the greater company was rapid and at the time of his death he was chief engineer, chairman of the manufacturing department and second vice-president of the company. His wife survives him; there were no children.

Mr. Hartupée was a man of generous nature, kind to his friends and employees and was highly esteemed. To his fellow-officers he was a loyal and pleasant associate. He was eminent in his profession. The modern plate glass works of the company at Ford City, Pa., and Crystal City, Mo., will long remain as monuments to his ability and genius. The plate glass industry in America has sustained a great loss through his removal.—The secretary has only recently learned that Allen Knowles, a former '77 man, died at Yarmouthport, Mass., on February 2, 1907. He was a civil engineer and was engaged in railroad work in the West for many years.—We also have to record the death of Frederick H. Prentiss, who was associated with the class of '77, but was graduated with '78. He died at Denver, Col., March 29, 1910. In his early days he was connected with John C. Hoadley, the prominent mechanical engineer, and also with the New York Heating Company, but nothing has been learned of his later life.—George L. Flint, of Reading, Mass., is connected with the Simonds & Poor Carbonator Co., of Boston.

1885.

I. W. LITCHFIELD, *Sec.*, Mass. Inst. of Tech., Boston, Mass.

Dave Baker has been very ill with typhoid fever at his home in Philadelphia, but we are glad to say that he is now on the road to recovery.—The Society for the Promotion of Industrial Education which held a meeting in Boston in November, brought a number of '85 men to the Hub,—Richards who was president of the society, C. R. Allen who is head of the Technical High School at New Bedford, Lyon who has general charge of the apprenticeship schools of the Westinghouse Electric & Manufacturing Co. and Tom Fry of the Sullivan Machinery Company, Claremont, N.H., who is much interested in the movement. A number of classmates were hastily collected at the Exchange Club, but because of previous engagements, neither Richards nor Allen were able to be present. There were about a dozen men there and it was a very happy reunion, indeed.—In Mr. Cattell's *American Men of Science*, which contains the names of a thousand men in the first rank of pure science in this country, the chemical department of the Institute has so many men of high rating that the Institute "easily leads" in chemistry. All '85 men are proud of Talbot's work in organizing and administering this department, but few would fully realize the ability he has shown in this direction were it not for such impartial estimate as the above. It is to be understood that in this report only men of pure science are considered.—If you have not laid in your winter supply of shovels yet, see the "Robertson" brand advertised in this issue and don't be happy until you get one or more.—Bert Pratt has taken to curling this winter and the report comes to us that he plays it as successfully as he plays golf.—The Congress of Technology which is to commemorate the fiftieth anniversary of the granting of the charter to the Institute, was suggested by Little as a means of calling the attention of the public to the intimate relationship of the Institute to industry.

1887.

EDWARD GALBRAITH THOMAS, *Sec.*, 36 High Street, Brookline, Mass.

Jules Cameron and his family are on a six weeks' trip to Panama and the Carribean Sea.—Coburn, however, is our champion traveler. He covered 70,000 miles during the year 1910, visiting Canada, Mexico and every state in the Union except seven.

1888.

WILLIAM G. SNOW. *Sec.*, 1108 Penn Mutual Building, Boston, Mass.

B. R. T. Collins has resigned from the Stone & Webster Engineering Corporation and is specializing as a fuel oil engineer with headquarters at 19 Congress Street, Boston.—William H. Gerrish is now smoke inspector of the State Board of Gas and Electric Light Commissioners with offices at 15 Ashburton Place, Boston, and residence in Malden.—The following is taken from one of the Boston papers of December 2:—

Because of the onerous duties now imposed on President Mellen of the New Haven and Boston & Maine roads the position of assistant has been revived and H. J. Horn has been chosen to fill the position. Mr. Horn is a graduate of Tech and was employed under Mr. Mellen during his presidency of the Northern Pacific in the operating department and in the coal department of that company, and made an enviable record for efficiency. He has of late been employed as assistant general manager of the Chicago, Burlington & Quincy road, west of the Missouri River. The rise of Henry J. Horn in railroad circles has been almost meteoric. He was born in St. Paul, Minn., and is the son of H. L. Horn, a prominent lawyer of that city. He was graduated from Tech in 1888, entered the service of the Northern Pacific Railroad as draughtsman at \$60 per month. In 1893 he was made road master and supervisor of bridges, and two years later division superintendent. In April, 1904, he was made general manager of the system.

1889.

WALTER H. KILHAM, *Sec.*, 9 Park Street, Boston, Mass.

William S. Johnson has been engaged to report upon the improvement of the water supply of Hyde Park. W. W. Lewis, '89, is chairman of the Water Board. He recently delivered addresses on the subject of water supply before the Weymouth Board of Trade and at the Braintree Forum.—Jasper Whiting writes: "As you know, I have been very much interested during the last few years in the development of a new process for the production of bleaching liquor and caustic soda by electrolytic means. After many trials and vicissitudes, a small plant was erected about two years ago at Rumford, Me., and since that time it has been repeatedly enlarged until now it is working successfully on a large commercial scale. In looking after the construction and operation of this plant, I have traveled between Boston and Rumford, a distance estimated to be over 25,000 miles, and as the scenery along the way began to get tiresome, I recently decided to change my route and start off on a journey of equal length, but in another direction—this one to the Far East—China, Japan, India, and all the rest. We expect to be away about a year and as we have no intention of keeping to the beaten track, I hope on my return to be

able to write you a letter of our experiences which will be of more interest to our classmates than is this one. In the meantime, I am leaving the management of our plant in the able hands of three Technology men of the best sort,—Hamblet, '02, Neale, '06, and Farwell, '06. You see I have been loyal to my *alma mater* in choosing my assistants. I hope to be with you at our class dinner next February, but if I am not, please remember me warmly to all the fellows."—Hollis French writes: "We have been extremely busy and prospects for the winter and next year are admirable. We have recently completed plans for all the engineering work on the Perkins Institution for the Blind, which I may have mentioned to you last time. These contracts are going to be let next week. We have also just finished the work for the new Boston Psychopathic Hospital, which is a state institution and connected with the Boston State Hospital, for whom we have also finished some work. This latter institution has planned an immense development which is going to require a large amount of engineering work, including a central power station, etc., and this we are working on at the present time in sketch form. The reinforced concrete factory for the Hallet & Davis Piano Co. at Neponset is just about to be turned over to the owners, who are very much pleased with it. We are drawing plans for some large reinforced concrete shoe manufacturing buildings, a power plant and making sketches for a warehouse. We are also doing the engineering for the new Boston Custom House tower, and are installing the latest type of low pressure turbine in the station of the Cambridge Electric Light Company, which will double the capacity of that plant. I believe this will be the first low pressure turbine plant in New England; or, at any rate, one of the first few. A number of very interesting engineering problems are involved in this Cambridge work. I try very hard not to allow business to interfere with pleasure, but I find it a little difficult of late years to get in quite as much shooting and sailing as I used to."—The *Electric Railway Journal* has the following:—

Mr. George W. Rounds, whose appointment as general superintendent of the Tacoma Railway & Power Company, Tacoma, Wash., was announced in the *ELECTRIC RAILWAY JOURNAL* of October 8, 1910, was graduated from the Massachusetts Institute of Technology in 1889. He became associated with Thomson-Houston Company on railway construction work at Nashville, Tenn., and Concord, N.H., after completing his college work, and remained with the company several years. Mr. Rounds served the Union Street Railway, Dover, N.H., as superintendent after resigning from the Thomson-Houston Company, and in 1896 he became connected with West Roxbury & Roslindale Street Railway, which absorbed the Norfolk Central Street Railway, Dedham, Mass., and was in turn taken by the Norfolk Suburban Street Railway, and then the Old Colony Street Railway. He was connected with this group of companies for about six years as superintendent. In 1902 he became manager of the Canton-Akron Railway, which is now operated

by the Northern Ohio Traction Company. After serving about three years with this company he became connected with Stone & Webster, Boston, Mass., going first with the Houghton (Mich.) Street Railway and then with the Terre Haute Traction & Light Company as general superintendent. In 1907 Mr. Rounds was appointed manager of the Savannah Electric Company in charge of the railway department. Early in 1910 he was made general superintendent of the Savannah Electric Company, from which position he resigned to go to Tacoma.

—Lewis has been busy solving the railroad problems of Hyde Park; he has proposed a plan for improving the railroad station and its approaches, and has been engaged by the town to plan a route through the town for the Boston & Providence Interurban Electric Railroad. As chairman of the Water Commissioners, he is just now engaged in the preparation of a report on proposed improvements in the town's water supply. During the summer he has been busy on the First Congregational Church building committee, who are erecting a fine new stone church and Sunday School building, which will be ready for opening in January and he invites all '89 men to inspect the plant which has been designed by Kilham & Hopkins.—Thorp spent two months of last summer with his family in Germany and Switzerland.—What the secretary wants from '89 is news, "all the news that's fit to print." The above items were extracted from his overmodest classmates only by physical force. If you are interested in this column send in anything you have. THE REVIEW will take it.—In answer to the secretary's query as to his work, Sauveur has kindly sent the following, which is of great interest. Certainly not all Tech graduates can show so great a record of achievement:

In 1886 Doctor Sorby, the highest microscopist, read a paper before the Iron and Steel Institute, in which he described the structure of iron and steel as revealed by the microscopical examinations of polished and etched specimens. To the reading of this paper must be ascribed the origin of the science now known as metallography.

Doctor Sorby's work attracted some attention and the subject was taken up by a few scientists and metallurgists in France and Germany. In America, however, no one seemed to realize the great possibilities of the new method of testing and investigations until I was asked in 1891 by the general manager of the Illinois Steel Company at Chicago to take up the subject. I was provided with a bare room in the chemical laboratory, an old-fashioned microscope and a barrel to serve as a table while the carpenter was instructed to construct a more adequate and ornamental support for my instrument. These modest beginnings were the origin of Applied Metallography in the United States.

I devoted five years to the development of this laboratory and that period was marked by great progress in the advancement of the new science. The interesting and important results obtained in Chicago and elsewhere attracted the attention of other steel makers and the equipping of metallographical laboratories soon started. Corey, now president of the United States Steel Corporation, made a special trip from Pittsburg to see the results we were obtaining.

In 1896 when John W. Gates was made president of the Illinois Steel Company, metallography received a severe setback at South Chicago, for the metallographical laboratory was closed on the ground of being an ornamental but useless feature, and the man in charge thanked for past services.

In 1896 I established in Boston, "The Boston Testing laboratories" continuing to devote to metallography a large portion of my time. I remained manager of these laboratories until 1905. In 1898 I founded *The Metallographist*, a quarterly review devoted to the advancement of metallography. It was very kindly received and undoubtedly contributed powerfully to the progress of the science. In 1904 the publication was made a monthly and its title changed to *The Iron and Steel Magazine*. Metallography continued to receive special attention in its columns.

In 1898 I delivered a lecture on metallography at Harvard University and the following year was offered an instructorship in metallurgy. In 1901 I was made assistant professor and in 1906 professor of metallurgy and metallography. From 1898 to 1903 I was also lecturer on Metallography at M. I. T.

Since the American beginning at South Chicago in 1891 metallography has progressed so steadily that it is now considered by most steel works and many other industrial establishments as necessary to the manufacture and control of metals and alloys as chemical analysis. The microscope is in daily use in more than three hundred industrial laboratories for the examination of metals, and metallography is taught in practically every technical school in the country.

The scientific importance of metallography has kept pace with its industrial development and to the study many scientists of renown have devoted a great deal of their time. Metallography has lifted the veil which was hiding from our view the true nature of metallic alloys.

I have written over one hundred papers or articles on metallography and related subjects. Some of them have been received most kindly and have perhaps constituted a progress in the advancement of the science.

I designed some special microscopes for metallographical work which are quite universally used in this country.

—Pike writes: "Mrs. Pike and I took quite an extensive tour in Europe this summer from Scotland down through England, France, the Black Forest, Switzerland and North Italy. We had the disagreeable experience of being detained in New York Harbor several days on account of a suspected cholera case. I have just been elected treasurer of the Rotary Club of Philadelphia, a newly formed business men's club."—Orrok writes: "Last summer I went to Europe with the Mechanical Society as guests of the Institute of Mechanical Engineers. We had beautiful weather and a reception which couldn't be beaten. Birmingham and London, three days each; special trains, fine excursions and most of the big men in England were there. W. C. Unwin has aged a little, but otherwise is the same as when he lectured at Tech a few years ago. Lodge, Burstall, Captain Sankey, Patchell, Merz and the other big engineers made us feel at home, and we had entrée to all the works. There were a bunch of "Tech" men on the trip. Then I had three

weeks on the Continent and an extra week in England and Scotland. Turbine manufacture was what I was investigating. Business in New York is slow, but I think is picking up a little. I have lectured twice this year at Beloit, Wis., and the Modern Science Club in Brooklyn, and am invited to lecture at New Haven before the Mechanical Engineering Society of Sheffield." Orrok read a valuable paper on "Transmission of Heat in Surface Condensation" before the American Society of Mechanical Engineers in December.—The annual dinner will be held on the last Monday in January, probably at the University Club, Boston.

1890.

GEORGE L. GILMORE, *Sec.*, Lexington, Mass.

The address of F. W. Crosby is 501-504 Denigree Building, New Orleans, La.—Charles Fitts is at 523 Railway Exchange, Chicago, Ill.—On November 15, at a meeting of the Boston section of the National Consolidated Gas Association, F. P. Royce, who is now with Stone & Webster, delivered an address on "The Commercial Department in the Development of Satisfactory Relations with the Public."—E. F. Bragg has been interested in building a dam in the Millers River at South Royalston, Mass. Bragg owns a number of water privileges in that section and in November came in competition with other parties who were building a dam in a similar position. We understand that the matter has not yet been settled as to who had the water rights at that location.—Charles Hayden, of Hayden, Stone & Co., who has just returned from a trip to the various porphyry properties, says: "At Chino the continual development of extensions of ore bodies which now show over 35,000,000 tons, of which 70 p. c. is to be extracted by steam shovel, is more than gratifying. The mill should be ready for operation about August. At Miami the new eight-section 2,000-ton mill is so near completion that it is believed that six sections will start early in January. The mine has been well opened for extraction. Inspiration has certainly opened up a very extensive ore body the past year and bids fair to extend its tonnage still further as development continues."

1891.

HOWARD C. FORBES, *Sec.*, 88 Broad Street, Boston, Mass.

Luis Francisco Verges died December 10, 1910, at his home in Wellesley Farms, Mass., after a short illness from a heart trouble of recent development. He was born at Arroyo, Porto Rico, May 31, 1869, the son of Eugene M. and Adrienne R. Verges. In 1876 he went to Spain, and attended a Jesuit school at Porta

Santa Maria for seven years. He came to this country in 1884 and prepared for Technology at the Allen school in West Newton. Entering with the class of '91, he took the course in civil engineering. After graduation he spent a year as assistant in civil engineering at the Institute, and then returned to Porto Rico, where he entered actively into the sugar business of his father. Later he built up and made profitable several other sugar plantations. At the time of his death his sugar interests are shown by the positions that he held. He was a director in the Columbia Sugar Company, the Santa Isabel Sugar Company, the Machete Sugar Company, the Borinquen Sugar Company, the Providencia Sugar Company, all located in Porto Rico. Early in 1910, he had taken an active part in forming the Association of Sugar Growers in Porto Rico, of which body he was vice-president. The purpose of this association was to improve the production of sugar by establishing experimental stations where various ideas and new methods might be tried out. His home while in the United States was at Wellesley Farms where his family consisting of his mother, father, two sisters and two brothers survive him.—Garrison sends the following report about the Choralcello:

During the past few months we have been developing our single manual instrument, one of which has just been sold to a church in Portland, Me., where the greatest satisfaction has been expressed in regard to its performance. We have also completed the application of a pneumatic player for both the single and the two manual instruments and can furnish these two types with or without self-player. A music department has been added at our factory where we adapt music to our sustained-tone instrument and where we cut our own rolls and are building up a library of music. E. G. Thomas, '87, has been actively engaged in the development of this department on its mechanical side. At our salesrooms in the Colonial Building, 100 Boylston Street, can be seen these instruments and at present there is a daily concert at 3 p. m. where we are pleased to have those call who are interested to do so.

—Hersam writes from Berkeley, Cal.:

I wish you could make everyone know how important it is to have the prospective Panama-Pacific International Exposition for 1915 held out here at San Francisco. The city and the state are extremely desirous of securing it here on the coast, and will do well with it if given the opportunity. It will be an added reason, too, for you men who are East to come West, once in a while, and look over towards China and Japan, or Alaska, or South, if you prefer. At any rate, speak a good word for California, for she will do well with the nation's choice if she is granted it.

1893.

FREDERIC HAROLD FAY, *Sec.*, 60 City Hall, Boston, Mass.

FREDERIC H. KEYES, *Asst. Sec.*, 88 Broad Street, Boston, Mass.

On November 18, 1910, the class held an informal meeting and dinner at the Technology Club, Boston, Mass., which was attended

by the following members: Baxter, Belcher, Bemis, Breed, Crosby, Cutler, Dawes, Densmore, Fay, Glidden, Keith, Keyes, Morss, the three Pages,—E. S., Edward and W. B.,—Pevear, Spofford, Taintor, Wallis and Thorndike. After dinner Spofford gave a very interesting lecture covering his trip with Professor Jaggard to investigate the damage and effect of the earthquake at Costa Rica last May. Spofford took this trip particularly to note the effect of earthquakes on different types of structures, and in connection with his lecture showed many very interesting illustrations of the disastrous effect on structures of steel and concrete not properly designed to resist such action. Spofford also described and gave illustrations of buildings constructed with wooden frame of special design, in combination with brick walls, which did resist the earthquake shock more or less successfully, indicating the desirability of using comparatively light wooden frame buildings instead of heavy stone or masonry construction except in the form of arches. The trip was extended to take in the Canal Zone, parts of the work being observed under most favorable conditions through the hospitality of Colonel Goethals. —H. W. Alden writes that the business of the Timken Company devoted to axles for automobiles, has been separated from the Roller Bearing Company and a new company was organized in July, 1909, known as The Timken-Detroit Axle Company to handle this branch of the business, with a large plant in Detroit. Alden is a stockholder and director in the new company, and is actively engaged in the management, holding the position of chief engineer, and also acts as consulting engineer for the Timken Roller Bearing Company of Canton, Ohio.—The Mexican revolution as it appeared to an American on the spot, is described by Charles V. Allen in a recent letter to the assistant secretary, as follows:—

Your letter arrives as the revolution in Mexico is rather fresh in our minds. In Mexico city it first appeared by a demonstration on the part of the students, against the Americans, resulting in a few being insulted and some broken windows. This was a result of the lynching of a Mexican in Texas. This spread to Guadalajara and a few other places. The result of a federal investigation developed a plan to start a real revolution and overthrow the government on November 20th. Were it not for the first demonstration the real revolt might have been more of a surprise and resulted more seriously. As it is the government has been very well able to handle the situation and at this writing the cities are all quiet and the fighting confined to the country in the State of Chihuahua. The whole revolt was too poorly organized to accomplish the government overthrow. The cause of discontent is due to the graft of those in power. The effect is to depress business, but affairs will shortly be normal. Fowle, '93, ought to have a few words for you as he was in the center of one of the combats.

—A. F. Bemis has just been elected to the board of aldermen, Newton, Mass., from the Chestnut Hill district.—Lyman A. Bowker has just been reelected for another year to the board

of aldermen, Waltham, Mass.—Leighton Calkins of the law firm of Bond & Calkins, 25 Broad Street, New York, is president of the Plainfield (N. J.) Country Club, of which city he is a resident. He is also a governor of the City Hospital and a trustee of the local Anti-Tuberculosis League. For several years he has served on the governing boards of the United States, New Jersey, and Metropolitan Golf Associations and was a member of the committee which framed the present rules of golf. He devised the system of golf handicapping now generally used, and drafted the new constitution for the United States Golf Association.—Philip B. Day, is now in the employ of the Great Western Automobile Company of Peru, Ind.; at the present time is in San Francisco, Cal.—J. W. Ellms writes that last summer he was a member of a committee on science, education and historical relics for the Ohio Valley Exposition held in Cincinnati and intended to advertise the natural resources, the manufacturing and industrial activities of Ohio and the states immediately south. Ellms has been directly interested in the design and construction of a large working model of one of the movable dams now being constructed by the United States government across the Ohio River below Cincinnati. He is president of the local section of the American Chemical Society at Cincinnati, which held a very successful joint meeting with members of other sections from Indianapolis, Louisville, Cleveland and Chicago last month, President W. D. Bancroft of the National Society and President Ira Remsen of Johns Hopkins University being present. Ellms is making a specialty of water purification and has lectured more or less on this subject before various clubs and societies during the past year.—Dr. Augustus B. Wadsworth's address has been changed to 114 West Fifty-fifth Street, New York City.—Edward Page has returned to Boston and is connected with the New England Gas and Coke Company, his address being 501 Shawmut Bank Building.—The address of Mrs. Herbert R. Moody is 280 Convent Avenue, New York City.

1894.

PROF. S. C. PRESCOTT, *Sec.*, Mass. Inst. of Tech., Boston, Mass.

The Lowell papers have recently announced the fact that H. S. Duckworth is soon to leave the Hamilton Woolen Company of Lowell for a position in charge of a large textile establishment at Haverstraw, N.Y. Duckworth has been engaged in various lines of work pertaining to textiles since undergraduate days. In his summer vacations while a student he worked at the Pacific Mills in the chemical laboratory and dyehouse, and after gradua-

tion took up the same line of work as his profession. Several years of this work were spent at the Cocheco Mills in Dover, N.H., where he began work as a chemist, but later became the director of the laboratories, dyehouse, etc., of the company. Following this he went to the Hamilton Woolen Company at Lowell in charge of their large plant and here he has remained until the present. During these years Duckworth has been a pretty regular attendant at our annual meetings and it is with very great regret that we learn of his removal to a more distant point. However, Haverstraw is not so far away but what we may hope to see him on frequent occasions. The best wishes of the whole class will follow him in taking up his new and important work.—F. A. Schiertz is at the present time making the final stages of a tour around the world. After being engaged in a variety of metallurgical works from Montana to Mexico, Schiertz was selected to take charge of some large smelting operations in China at Hunan. After two years here Schiertz started on a tour eastward to visit his old home and relatives in Germany and after some time spent there the latest report is that he is on his way to America. He will undoubtedly visit the Institute soon after he arrives, and possibly if time will permit we may get together a little bunch of '94 men to meet him.—H. N. Parker is another '94 man who has recently returned to Boston after a somewhat varied and interesting career. Beginning with work as a health officer in a New Jersey town Parker accepted a sanitary position with the Geological Survey and in this capacity was engaged on a number of investigations at various parts of the country, the most extensive being perhaps a sanitary survey of the Chesapeake Bay. Since resigning from the survey Parker has been one of the constructing engineers for the Bithulithic Company, but as midwinter is a bad time to put down pavements in New England, his time for a few weeks is less fully taken up than formerly, and it is a great pleasure to see him around the club and elsewhere in Boston.—Sayward has become more or less prominent through his dramatic writings and as a member of an amateur theatrical company or troupe at his home in Wayland. One of his sketches has recently been presented at the Bijou Dream Theater, although not in exactly the form in which it was written. Sayward has long had the dramatic instinct and from the work which he has done one may predict that he will be heard from in this line of work in a more pronounced way in the future.—F. H. Clark is engaged in civil engineering work in and about Brookline. Apparently he is too busy to look up his old friends, but the secretary sees him occasionally as he hurries from place to place on various kinds of work.—The secretary has recently received a letter from H. M. Chase who is vice-president of the Investment Trust Company of Wilmington, Del. He sent best regards to the '94 outfit.

1896.

CHARLES E. LOCKE, *Sec.*, Mass. Inst. of Tech., Boston, Mass.

Charlie Morris spent three days in Boston in November taking his annual United States physical test. He elected horseback riding. Up to present writing we have not heard whether he has fully recovered or not.—It is not proposed to hold an annual meeting of '96 men this year, but at the alumni dinner on January 4, it is expected that a sufficient number of men will be present to talk over the matter informally and appoint a committee to make arrangements.—The men of '96 in Massachusetts appear to be in a good position to help the cause of enlarged grant of state aid from the legislature this year. The secretary has received a number of replies from various men and in almost every case the man has either already spoken to his representative or has engaged to do so in the near future.—Senator E. C. Hultman is not a member of the Massachusetts legislature this year. Three years were apparently sufficient, or else he foresaw the Democratic landslide and got out from under.—One very striking thing regarding the men of '96 is their permanency. In looking over the lists of addresses which are now coming in for the new register of graduates, the secretary has not yet found an instance of a change, from which it appears that the fellows are now well settled in permanent positions, and that their roving days are over.—Owing to the short time since the last REVIEW these notes are not so full as the secretary would wish.

1897.

JOHN ARTHUR COLLINS, *Sec.*, 67 Thorndyke Street, Lawrence, Mass.

It is none too early to think and plan about what we are going to do in 1912 towards celebrating the fifteenth (my, but we are getting to be "old boys!") anniversary of our graduation. Those who were present at the decennial of the class will recall the good times they had; but the number of participants was very small. We should make a better showing in 1912. To this end it is planned to have all the Boston and vicinity men, in fact, any and all '97 who will come, meet at an informal dinner in Boston early in January. A committee will then be formed and some line of action agreed upon. If any of the class have any suggestions to offer send them on to the secretary who promises to keep them in cold storage until the proper time to bring them out.—Howard A. Noble (II.) was married on Wednesday, December 7, to Miss Katharine Babcock of Pittsburg, Pa. They will be at home after January 1, at 1235 Shady Avenue. Noble is with the Pittsburg Spring & Steel Co.

1898.

E. F. RUSS, *Sec.*, 70 High Street, Boston, Mass.

It will be of interest to the class to know that R. Winthrop Pratt, engineer of the Ohio State Board of Health, has become an author in collaboration with Leonard P. Kinnicutt, of the Polytechnic Institute, Worcester, Mass., and C.-E. A. Winslow of our own class, has written a book on Sewage Disposal that bids fair to become our standard work on this important subject.—Walter G. Zimmermann is now in Duluth, Minn.—Edward M. Taylor is with the Roebling Construction Company, New York City.—Benson B. Priest is with the American Bridge Company also in New York.—Ray C. Faught is with the General Electric Company, Baltimore, Md.—We note that D. W. Edgerly is now in New York at 17 Gramercy Park.—Chester F. Drake is with the Pittsburg Filtration Works, Aspinwall, Pa.—William A. Marshall is now with the New England Gear Works, Boston, where he has been for a number of months.—George O. Haskell is now in Houston, Texas.—R. H. Danforth is with the United States Naval Experimental Station at Annapolis.—A. H. Tucker is with the Library Bureau, Ilion, N.Y.—Prof. F. L. Bishop is now at the University of Pittsburg.—George E. Mathews can be found care of Frank M. Andrews & Co., Waldorf Astoria, New York City.—Leroy E. Peavey is in Wellesley Hills, with Babson Reports.—David L. Wing is with the Bureau of Corporations, Washington D.C.—On Saturday, December 3, Dr. S. F. Jones was married to Miss Cordes in Denver, Col.

1899.

H. J. SKINNER, *Sec.*, 93 Broad Street, Boston, Mass.

Sutermeister has resigned his position with the United States Forest Service and has returned to his former one as chemist for S. D. Warren & Co., Cumberland Mills, Me.—Tucker is now with the Union Copper Company, Gold Hill, N.C.—Loomis, of the Packard Motor Car Company, was in Boston during the fall.—Hinckley, engineer of tests for the New York, New Haven & Hartford Railroad Co., has been transferred from New Haven to Boston. His office is in the South Station.—Packard has left the United States Patent Office and is now with Kiddle & Wendell, 115 Broadway, New York City.—Gilpin is with Gilpin, Van Trump & Montgomery, Wilmington, Del.—Herman is with the Southern Railway Company, with offices at Washington, D.C.—The following changes of addresses have been received:—Lawrence Addicks, United States Metals Refining Company, Chrome, N.J.—Thomas W. Bailey, 901 Colcord Street, Oklahoma City, Okla.—Miss Bertha L. Ballantyne, 101 Mt. Vernon Street, Boston, Mass.—

Walter R. Bean, 11 High Street, Woodbury, N.J.—W. W. Bonns, Highmoor Farm, Monmouth, Me.—Herbert M. Case, 5 Jerome Place, Upper Montclair, N.J.—H. M. Cushing, 681 Ellicott Square, Buffalo, N.Y.—Timothy J. Driscoll, 230 North Second Street, Harrisburg, Pa.—James B. Ellery, 532 Jefferson Street, Gary, Ind.—George C. Glover, 8 Beacon Street, Room 74, Boston, Mass.—A. W. Grosvenor, 311 Bank Block, Fort Wayne, Ind.—Benjamin S. Hinckley, 162 Park Street, Newton, Mass.—Harry G. Johnson, P. O. Box 5077, Boston, Mass.—William B. King, 44 Baker Avenue, Beverly, Mass.—James G. Leiper, Jr., 17 Summit Street, Philadelphia, Pa.—Clarence A. Moore, 81 Walnut Street, Arlington, Mass.—Albert F. Nathan, 2 Rector Street, New York, N.Y.—Herbert H. Riddle, care of Riddle & Riddle, First National Bank Building, Chicago, Ill.—Roland W. Stebbins, University Club, Tacoma, Wash.—Philip Stockton, 17 Court Street, Boston, Mass.—Frank R. Swift, 394 Pearl Street, Buffalo, N.Y.—Lewis R. Whitaker, 45 East Seventeenth Street, New York City.—Charles F. Wing, Jr., 36 Purchase Street, New Bedford, Mass.—John W. Woollett, 82 State Street, Albany, N. Y.

1900.

INGERSOLL BOWDITCH.

GEORGE C. GIBBS.

N. J. NEALL, *Sec.*, 12 Pearl Street, Boston, Mass.

RICHARD WASTCOAT.

PERCY R. ZIEGLER.

The members of our class will be pleased, if not startled, to hear that the stork visited the home of John F. Wentworth, (XIII.) on November 11 and presented him with triplets: Barbara Blair arriving at 12.30, William Ezekiel at 1, and Laura Elizabeth at 1.30. The latest reports are that the family is in the best of health and Wentworth seems unconscious of the double distinction which he enjoys in class matters not only to have the class boy, but also the class triplets. Wentworth certainly deserves a cup.—T. E. Penard (VI.) and N. J. Neall, (VI.) both attended the summer convention of the New England Section National Electric Light Association at the Griswold, Eastern Point, New London, in September. Penard, in his work with the Boston Edison Company has active control of the switchboard design and other central station problems and has done quite important work since leaving Tech. The switchboard at the L Street station is a very interesting piece of work and unique in this respect, that it was built under the direction of the Edison Company and thus establishes a standard arrangement of its own. Furthermore, the switchboard practice of this company is said to be very satisfactory and successful. It is not unreasonable to hope that Penard will one of these days advance from his present position as assistant to the engineer, to head of some department. It was very much like

old times in Course VI. for Penard and Neall to get together and they both can testify to a very successful visit at the convention. The meeting was not at all a dry one.—S. B. Miller, (X.) has been transferred to the Wilmington (Del.) office of the duPont Powder Company and took up his duties in the new place on December 15. The Marquette works, of which Miller has formerly been assistant superintendent, are being closed down. Miller is reluctant to leave the northern country as he has been very happy there owing to the climate being particularly beneficial and Mrs. Miller has her home there. The step, however, indicates an advancement for him and it is with best wishes for his success that his friends see him returning East. Miller recently received a silver loving cup as a prize for having done especially meritorious work in the output of the Marquette plant, thus rivaling the other constituent stations of the duPont Powder Company.—The first class dinner of the current year was held at the Technology Club on November 21, 1910, the following men being present: Ashley, Bowditch, Burns, Draper, Emery, Gibbs, Reardon, Richardson, Russell, Wentworth and Ziegler. The question of the class book was brought up and discussed. It is hoped that before the next dinner the book will be in such a shape that we can tell how much it is going to cost and how it should be printed. It is planned to hold three or four more dinners during the winter and two members of the class have promised to give illustrated talks on some part of their work. In this way we hope this year to hear from Fred Lawley on yacht design and from Jennings on interior decoration.—Bowditch, treasurer of the class committee, reports as follows:—

APRIL 1, 1909, TO DECEMBER 1, 1910

Receipts

Balance received from H. E. Osgood.	\$39.25
Contributions from members	255.80
	<hr/>
	\$295.05

Expenses

Paid bills turned over by H. E. Osgood	\$46.62
Paid expenses Tech reunion, June, 1909	29.73
Paid expenses for preparation of class book.	69.81
Committee expenses	10.11
Balance on hand December 1, 1910	138.78
	<hr/>
	\$295.05

—Batcheller (III.) has gone West again and is now located at Britannia Beach, B.C., with the Britannia Mining & Smelting Co.

—Cutting has likewise taken a long jump and is now to be found care of Chief Quartermaster, Philippine Division, U.S. Army, Manila, P.I.—1900 men are becoming well represented in the Orient for Tiffany who is now Capt. George S., U.S.A., is also in Manila.—Oxnard writes that Leary is now in charge of a surveying party for the Bangor & Aroostook Railroad at Houlton, Me., and is very much liked by his chief engineer.—It is reported that Sperry (II.), who is manager of the Savannah Electric Company, one of the Stone & Webster plants, has made quite a success of his work and has just announced his engagement, although we are not advised of the young lady's name.—Harry Lesley Walker (IV.) has been compelled to place the management of the Atlanta office of his firm, King & Walker, in the hands of a superintendent and move to New York City. A good portion of Walker's time is spent in the South as King & Walker have a number of buildings under construction in that vicinity.—Collier (VI.), who is still contract agent for the Georgia Railway & Electric Company, says that he is so busy doing his work and keeping somebody else from taking his job, that nothing particular happens to him. We learn, however, that he was chosen vice-president of the newly formed Georgia section of the National Electric Lighting Association and that he has also been appointed by the National Electric Vehicle Association, chairman of the Georgia Membership committee, so that it is quite clear that Collier is an active man, however modestly he may disclaim it. Collier is a very helpful correspondent in class matters and always wishes to be remembered to his old friends. Here's hoping that his coöperation in this work will be contagious.—Leonard (I.) writes us that Bill Angus was married in the latter part of November.—Course VI. men will remember Shumaker who graduated with us, although he began as a '99 man. Shumaker, who is now superintendent of traffic of the Telepost Company, with offices at 225 Fifth Avenue, New York, writes Neall as follows:—

I wish to explain that while I did not graduate till 1900, I was three years with the class of '99 and always think of that class as mine. I know few of the class of 1900 outside of Course VI. I am offering this not because I refuse to be classed as a 1900 man, but as an explanation of my relative lack of interest in 1900 matters. It is not at all bad to be claimed and feel at home in two classes; but it is a good deal like having two homes—you hardly know where to live. I have seen none of the 1900 men, at least none that I know as 1900 men, except Charley Corbett; I am not sure that he is 1900. He started as a Course VI. man with '99, but changed to Course IX. Do not know for sure but think he was out one year and graduated with 1900. He is in New York, advertising manager for some magazine, and I see him once in a long while.

—Russell Suter (I.) has moved his headquarters to Albany, N.Y. He is still with the Water Supply Commission.—Tudbury (I.) is now located at 33 Main Street, Utica, N.Y.—Bender has changed his address to 6011 Kimbark Building, Chicago, Ill.—Sohier is at

Concord, Mass.—Neall announces the termination of his partnership with Thomas, '93, at the end of the year in order to practice independently. He will retain his present office and follow the same class of work as before.—The class should be grateful to Davis for his cheerful communications; in fact, he might appropriately be called "contributing editor." His latest (by request) is as follows:—

And as a reward of merit, I will let you into a new discovery of mine. Only my closest and dearest have been given an option on it. *A corn cob pipe is the best smoke.* I've been trying them all—for a decade—and I know. I've tried the lowly clay, the natty briar, and the luxurious meerschauum. I've experimented with the South African calabash and Ottoman hookah. I've pulled at Indian tomahawks, shin bones and old hickory. But they are all temporal and transient. The firm and true, unfailing and fathomless, the sympathetic and inspired, the ancient and honorable, the corn cob for me.

—Dick Wastcoat (I.) has finally settled down at Taunton and writes interestingly about his new work as treasurer of the Evans Stamping & Plating Co., as follows:—

Regarding news about the other fellows, I have not seen any of them. When I wrote the class letter I used to work in my own advertisements, but as we have entirely sold our output for 1911 and probably more than we can manufacture with our equipment, there doesn't seem to be much need of advertising. Mr. Van Bibber and myself obtained control of this concern last July and we have entirely reorganized the same. The name is entirely misleading at the present time. The concern originally started manufacturing nickel stove trimmings for stove foundries in this city, of which there are a large number. At the present time a number of foundries have put in plants and are doing the work themselves, which was originally done by this concern. Mill oilers are a relic of the business that was originally started in the factory in which we are located. This oiler is so constructed that there is a steady flow rather than a "squirt," and is used entirely in the textile factories, so that the goods which are being manufactured will not be covered with oil which is liable to spatter.

The "Paragon" gear is the last development of this concern, which has met with tremendous success. Last year it was impossible to fill all the orders received, with the amount of machinery on hand. This year we have already taken contracts from engine manufacturers for over two and one-half times the quantity turned out last year. The gear is attached directly to marine engines and is built in such a way that it rests on part of the engine bed, so that it becomes an integral of the equipment. We have added this year, some of the largest marine engine manufacturers in this country who will make the gear a part of their standard equipment.

If any of the fellows are ever in town I should be very glad to have them call to see me and take them through the factory and see what they think of our organization.

—Rondel Lewis died June 23, 1910. He leaves a widow.—The latest changes of addresses are as follows:—C. M. Leonard, McCormick Building, Chicago, Ill.—John B. Conant, 21 Vine Street, Somerville, Mass.—Albert B. Briggs, Room 239 South Station, Boston.—Isaac Osgood, 36 Osgood Street, North Andover, Mass.—Harry L. Walker, 35 Webster Avenue, Armour Villa Park, Yonkers, N.Y.—R. C. Simpson, 231 Forty-ninth Street, Newport News, Va.—Mortimer Silverman, 142 North Union Street,

Olean, N.Y.—Charles E. Sherman, 139 Main Street, Westerly, R.I.—A. G. A. Schmidt, National Equipment Company, 412 Monadnock Block, Chicago, Ill.—Arville C. Redman, 16 Ayrault Street, Newport, R.I.

1901.

ROBERT L. WILLIAMS, *Sec.*, 154 Magazine Street, Cambridge, Mass.

Henry R. Gilson writes from Economy, Pa., where he is engineer for the National Metal Molding Company, that he has four children, two boys and two girls; also that he has applied for eight patents.—Joseph D. Evans is in full charge for J. G. White & Co., New York, of the field work in the development of the Canadian Light & Power Co. and directs five hundred men.—Joseph A. Gund is president of the Gund Graham Company, stone and cement contractors, Freeport, Ill.—Frank B. Walker is located in St. Paul, Minn., and is resident engineer of the Great Northern Railroad.—H. H. Kennedy as division superintendent of traffic for the New York Telephone Company directs six men and eight hundred and seventy-five women.—Francis E. Cady is engaged in research work on the production and utilization of light. He has written an article for the *Electric World* on "Uniformity in the Photometry of Colored Light Sources." He has also delivered a lecture before the Philadelphia section of the Illuminating Engineering Society on "Selective Emission of Incandescent Lamps."—E. J. Proulx is engaged in hydraulic engineering at Glenside, Pa.—Donald A. Kohr manufactures paint, varnish, and tin cans. In reply to the secretary's question as to what he has done outside of his work, he says "Have been raising my family." He has two boys, three and four years and doubtless they keep him out of mischief if he does not them.—T. Frederick E. Reardon in the publication department of the General Electric Company works on technical publications and nameplate data for the entire company.—D. L. Ordway is assistant director of the research laboratory of the National Carbon Company.—Howard I. Wood as incandescent lamp engineer for the General Electric Company has the problem of maintaining the quality of the present product as well as research work to produce a new or improved product.—W. W. DeBerard has written an article in the *Journal of the Western Chemical Society* on "Some Aspects of Water Purification."—Edmund H. Brigham has recently become the proud father of a baby daughter.

1902.

F. H. HUNTER, *Sec.*, 75 Park Street, West Roxbury, Mass.

The first class gathering for the season was held at the Boston City Club on the evening of Tuesday, November 8, with twenty-five men present. Dinner was served and instrumental music and Tech songs added to the good cheer of the occasion. The date was set, unintentionally, on election day and some energetic scouting by Stillings brought in returns from time to time. Unfortunately, the Democratic landslide which these returns showed did not evoke unmixed enthusiasm. The feature of the evening was a talk by John Gordon upon his experiences in Egyptian and Soudanese campaigns of the middle eighties. Mr. Gordon, who is a brother of the Rev. Dr. George A. Gordon who preached 1902's Baccalaureate Sermon, told in a simple, vivid manner of leaving his boyhood home in Scotland to enlist in the famous Black Watch Regiment of the British Army. Soon his regiment was ordered to Egypt where it took part in the battles that won Lower Egypt and later in the campaigns against the Soudanese and the famous relief expedition, up the Nile, to Khartoum. The night march to Tel El Kebir, the battle of Suakim, and the experiences in a cholera camp were some of the events which were described, but the most exciting was the battle of Tamaia, where "Fuzzy Wuzzy bruk the Square." The entire talk was of unusual interest. The classmates present at the dinner were: Boardman, Bourneuf, Collier, Everett, Finneran, Fisher, Hall, Hunter, Mahar, Mardick, Millar, Moore, Pendergast, Joe Philbrick, Robinson, Ritchie, Shedd, Simpson, Stillings, Teague, Walker, R. F. Whitney, Whittet, "Doc." Williams, and Williston.—The class will hold other gatherings later in the season, but no dates are yet set. There will be a bowling party in Boston the latter part of January and a dinner is proposed for New York in February. Annual reports are being prepared by the secretary, and will be mailed, together with the usual "touch" for dues, early in January.—Robbie Pope was married on November 12 to Miss Laura Helen Fischer at St. Michael's Church, New York City. A reception at the home of the bride's parents, Mr. and Mrs. Philip A. Fischer, followed the ceremony.—Philip Whitney was recently made assistant professor of graphics in the Department of Architecture at the University of Pennsylvania.—Greeley reports a second son in his family. The name of this new scion of Course IV. is Roland Bradford Greeley and his birthday is October 22.—Joe Philbrick has a son, Joseph Edward, who saw light upon October 11. He is reported as making good progress in preparing for the entrance exams. at the Institute.—Robert Bass Mayo who arrived on November 5 is another addition to the '02 offspring.—Willard Morse's daughter, reported in the last

issue of *THE REVIEW*, is named Olive Goodell, and was born on the first day of July. Morse is now located with the American Smelting & Refining Co. at their Perth Amboy plant. His residence address is 233 High Street, Perth Amboy.—Wadleigh is now located at the Marine Barracks in Boston.—Butler has been transferred by Stone & Webster from Lowell, Mass., to Jacksonville, Fla.—H. L. Pope is at the West Works of the Pope Manufacturing Company at Hartford, Conn.—Cates is reported with the Ray Consolidated Copper Company at Ray, Ariz.—Sears has left the engineering staff of the Charles River Basin Commission and is with Lockwood, Greene & Co., the well-known mill engineers, at 93 Federal Street, Boston.—Millar has moved his office to 146 Summer Street, Boston.—Haddock's residence address is 195 Davis Avenue, Brookline.—O'Neill has moved his home from Malden to Newell Avenue, Needham, Mass.—Don Belcher is with the Metropolitan Sewerage Commission, 17 Battery Place, New York City.—Hammond is back on a vacation after two years of work on the Isthmian Railroad at Panama.—Allbright is with the Sturtevant Mills Company, Harrison Square, Boston.—We quote the following from the daily press to show that '02 men are always up to date:—

Powder puffs must no longer be used in the barber shops of Montclair, N.J., according to an edict issued by Health Officer Chester H. Wells. Mr. Wells declares that the powder puff in barber shops is unsanitary, and hereafter the barbers will have to apply the talcum in some other way.

The use of sponges in barber shops is also barred.

—All the Boston men will be glad to know that Hooker has returned to town after completing his work in Salt Lake. He has been much missed from our '02 gatherings while in the West. He showed the secretary a letter from Brodie, who is selling machinery for the Sullivan Machine Company in Australia. His headquarters are Australasia Chambers, Martin Place, Sydney, New South Wales, but his work takes him to all parts of the Island continent.—McCarthy was recently chosen county surveyor of Clark County, Nevada.

1903.

F. A. OLMSTED, *Sec.*, Oregon City, Ore.

R. H. NUTTER, *Asst. Sec.*, Lynn, Mass.

H. S. Morse spent a few days in and around Boston early in October. He was looking "husky" and from his appearance it would seem that the climate at Louisville, Ky., agrees with him. On his way from Louisville to Boston he stopped over in New York and reported having had a very pleasant time at an informal dinner of 1903 men at the Technology Club of New York.—

There seems to be something about the Pacific Coast which appeals very strongly to 1903 men. Our secretary, F. A. Olmsted, has left Boston and is now with the Willamette Pulp & Paper Co., Oregon City, Ore.—Newman also has made a change and is located in Los Angeles, Cal.—Pulsifer's new address is Murray, Utah.—R. C. Tolman has become a member of the faculty at the University of Michigan.—On October 30 the marriage of K. W. Endres to Miss Helen Morgan Cross of Jenkintown, Pa., was announced.

1904.

EVERETT O. HILLER, *Sec.*, care of Pneumatic Scale Corporation, Ltd., Norfolk Downs, Mass.

ADDISON F. HOLMES, *Asst. Sec.*, Mass. Inst. of Tech., Boston, Mass.

The serious delay in the publication of the October REVIEW has proved a handicap to the secretary as that contained his first class letter and was relied upon for an introduction, as it were, and as an opportunity to appeal for news.—Rockwood has spread out and is now a member of the firm. His card reads quite naturally,—E. F. Rockwood, A.M., American Society Civil Engineers, chief engineer, New England Concrete Construction Company, 201 Devonshire Street, Boston. "Tammy" will build you anything that may be made of concrete.—We have received and note with heartiest congratulations the announcement of the marriage of Miss Carolyn Bushnell Allen of Cincinnati to Currier Lang. Mr. and Mrs. Lang will be at home after January 1 at 177 Joseph Campau Avenue, Detroit.—H. T. Kalmus has been made professor at Queen's University, Kingston, Ontario, Canada. A letter is due from the professor telling us of the relative merits of the German, American and Canadian universities as he has seen them.—It is reported that "Volts" Ovington is in France seeking a Blériot monoplane with which to become an expert and to return for next season's flying here. Ovington has always been flying a little higher than the average and we may look to him for remarkable achievements in this new line. He was last seen by the secretary taking high tension, high frequency shocks at the electrical show last winter and giving a very interesting demonstration of its peculiarities. He has been further heard of as president of the American Motor Cycle Association.—I quote part of an interesting letter from our class "kid," George H. Powell:—

About two years ago I had an opportunity to come with the Loomis-Manning Filter Distributing Company in the capacity of engineer for the company. We manufacture water filters of all sizes and for all purposes, but this isn't an advertisement so I won't dilate further. The work is interesting, congenial and has splendid prospects. Though not much related to Course XIII., yet the Tech course has been of great value and I have never regretted learning "my profession" as it were.

The only '04 fellows I ever see around here are Bartlett and Bascom, and it's mighty seldom I run across them. Bascom is with the Fayette R. Plumb Company, large manufacturers of small tools; and Bartlett is with the American Water Softening Company. I correspond regularly with S. A. McClung, '04, with whom I roomed at Tech, and he is practising law in Pittsburg. My other roommate, Charlie Homer, you probably know more about than I do, for I have seen him only twice since we left Tech and had only one letter. My engagement to Miss Mary E. Bousack of Philadelphia was announced last August. Though no date has been set for the wedding, we hope it will be within a year.

—Ernest L. Rupf announces the birth of a daughter, Ernestine Blanche, born November 28, 1910.—“Charlie” Hoy (X.) was in Boston during the late “Gas Show.” He is managing successfully several gas companies in New Jersey.—The following changes of addresses have been noted lately: J. E. Cunningham, 2 Louisburg Square, Boston.—William H. Koppelman, 708 Commercial Street, Cairo, Ill.—F. K. Merriman, The Catholic University of America, Washington, D.C.—J. W. Roland, Isthmian Canal Commission, Toro Point, C.Z.—W. Dewitt Vosbury, care of Roberts Filter Manufacturing Company, Darby, Pa.—Clark D. Simonds, 224 North Twenty-fourth Street, Portland, Ore.—Edward F. Parker, 7 John Street, Reading, Mass.—L. W. Nickerson, 217 Pleasant Street, Brockton, Mass.—R. R. Newman, 607 Park View Avenue, Los Angeles, Cal.—William L. Doten, 80 Radcliffe Street, Dorchester, Mass.

1905.

GROSVENOR D'W. MARCY, *Sec.*, 246 Summer St., Boston, Mass.

Sidney L. Cole and Miss Eleanor Guenther Winther of Somerville were married on October 25. On the 27th of October James F. Fouhy and Miss Helen Frances Farrell were married at Somerville. These two lone items show good activity in the little town of Somerville, but what are '05 men doing in the rest of the world? —The secretary has been recently made secretary of Sampson & Murdock Company, Boston, and has not had time to go hunting for news, but expected the fellows to send in items about themselves and others better than they have done. Try to send in something interesting before March, for the next magazine number of the REVIEW.

1906.

RALPH R. PATCH, *Sec.*, 15 Lincoln St., Stoneham, Mass.

On account of the absence of the secretary and the illness of the assistant secretary class news has not had its proper attention in the REVIEW this month.—The principal items of interest refer to marriages and engagements which are as follows: Announcement is made of the marriage of Helen Frances Farrell of Somerville,

Mass., to James Francis Fouhy, on October 27, 1910. Mr. and Mrs. Fouhy will be at home on January 1, at 1018 Forty-Seventh Street, Brooklyn, N.Y.—A clipping from the *Cincinnati Inquirer* states that when Edward B. Rowe of Newark, Ohio, was a student at Technology he met Miss Hewlett of West Newton, to whom he has recently become engaged. His address is Newark, Ohio.—The engagement is announced of Miss Florence H. Dennis and Louis Kilham Tripp. Tripp is a government architect located in Washington, D.C. Miss Dennis is the daughter of Frederic H. Dennis of Newton Lower Falls, Mass.—A recent number of the *Boston Globe* contains an article on Miss Eleanor Manning, who has just been notified by the Gymnasium and Field Association at Smith College that her plans for a new boathouse for that institution have been accepted. The cost of the new boathouse will be \$3,300. This adds to Miss Manning's reputation as an architect as she has already been quite successful in this line. Most of her professional work has been in connection with detached houses and city blocks at Lynn, Mass., where she resides.—C. R. Wilfley writes that his address has been changed from Hostotipaquillo, Jalisco, Mexico, to Barstow Mine, Ironton, Col. We are very grateful to Wilfley for getting out of a place with a name like that. We have wrestled with this name many times and there seems to be no way out but to set it to music and play it on a horse fiddle. Wilfley is manager of the Barstow Mine at Ironton, Ouray County, Col.

1907.

BRYANT NICHOLS, Sec., 143 Garland Street, Everett, Mass.

W. W. BIGELOW, Res. Sec., care J. R. Worcester Co., Waltham, Mass.

I. On the Part of the Secretaries

The secretaries are going to try a new plan of class correspondence. They believe that the chief cause of the failure of the former plan of having correspondents endeavor to keep in touch with a certain group of men, the division being made on a geographical basis, was that under that method a correspondent wrote letters to fellows whom he did not know personally, with whom he had no common interest, and frequently with whose faces he was not familiar. We believe that if we can devise a scheme whereby every correspondent knows every man he writes to fairly intimately, we shall be able better to get the result for which this plan was originated, namely, the securing of the largest amount possible of news concerning the men of '07. We have one idea in mind now, and we should be glad to receive suggestions along this line. If any man reading this, whether he be of the class of 1907 or not, has any ideas, we should be grateful if he would tell

us about them. The method which is finally adopted will be described in the next REVIEW. The letters from the secretaries, together with bills for class dues were sent out about January 1. Some results are evident already. Please help make the records of the secretaries complete and the bank account of the class larger by doing your part.

II. *Miscellaneous Notes*

On Saturday evening, December 10, an informal dinner of the '07 men in Boston and vicinity was held at the Technology Club, Boston. We had a good dinner, President Macomber presiding, after which "Ike" Litchfield told us many interesting things in his own bright and optimistic way about Tech doings among the Corporation, the alumni and the undergraduates. Then we went upstairs and had a good social time exchanging experiences. The following fellows were present:—P. R. Nichols, W. F. Kimball, E. E. Turkington, Ralph Hudson, George Norton, Alexander Macomber, Don Robbins, R. K. Taylor, Harry Hall, J. E. Garratt, Gilbert Small, Clarence Bowen, Walter Bigelow, "Tucky" Noyes, Leon L. Allen, Bob Albro, Charlie Allen, Sidney Wells, Bob Thayer, John Mahar, R. P. Stevenson (otherwise known as "Stealthy Steve"), H. W. Mahr, Harold Wonson and Bryant Nichols. It is the plan of the Boston bunch to hold informal dinners of this sort every other month. The next one will occur Saturday, February 11. Put that date down in your engagement book, and if you can be in Boston then, whether you receive another notice or not, come around to the Technology Club on that evening, and you will find a jolly bunch of your old friends.—Bob Albro is living at 452 Lake Avenue, Manchester, N.H.—Charlie Allen's address is 64 Cherry Street, Spencer, Mass.—Alvord is in Brunswick, Me., professor at Bowdoin College.—F. W. Amadon, 115 Howe Street, New Haven, Conn.—C. A. Bowen, 94 Canton Street, Lowell, Mass.—E. L. Chaffee, 109 Pearl Street, Somerville, Mass.—Harry R. Crohurst, 224 Huntington Avenue, Boston, Mass.—P. V. Dodge, 724 Ninth Street, North, Washington, D.C.—J. G. Barry can always be reached through his home address, 5 Buffum Street, Salem, Mass. In November he was with the Cortez Mining Company, Jacala, Hidalgo, Mexico.—A. H. Donnewald may always be reached through American Institute of Mining Engineers.—Dr. Joseph Struthers, Assistant Secretary, 29 West Thirty-ninth Street, New York City.—J. T. Fallon is at 80 Washington Square, East, New York City.—J. E. Garratt is with the city engineer of the City of Waltham, Mass., 6 Lexington Street.—G. S. Gould, 543 Pine Street, Manchester, N.H.—Ralph Hudson's mail should be addressed to him at the Institute.—Bob Keyes is with the B. F. Sturtevant Company, at Cleveland, Ohio, 423 Schofield Building.

—John Kimball is now in Easton, Mass.—Dan Loomis, 727 State Street, Springfield, Mass.—H. J. C. MacDonald, Goose Bay, B.C., via Prince Rupert.—Macomber should be addressed at the Technology Club, 83 Newbury Street, Boston, Mass.—J. T. Mahar is at 92 State Street, Boston, Mass.—P. R. Nichols, Prospect Street, Reading, Mass.—G. R. Norton, First Lieutenant Coast Artillery Corps, Fort Andrews, Mass.—The men of Course II. will remember Arthur Pratt, a Princeton man. We all congratulate him upon his engagement to Miss Dorothea Curtiss at West Hampton Beach, Long Island, N.Y., last October.—“Kelly” Richards is living at 22 Regent Street, West Newton, Mass.—V. S. Rood, we understand, is with the Utah Apex Copper Company, Bingham Cañon, Utah.—Winsor Soule is at 1571 Beacon Street, Brookline, Mass.—Ed Squire has left Tech, and is in the automobile business in Boston, address, 57 Oakwood Avenue, Newtonville, Mass.—R. P. Stevenson is at 45 Princeton Street, Lowell, Mass.—The secretary had a pleasant surprise in December in meeting at his place of business, the Revere Rubber Company, Chelsea, Mass., Sheldon P. Thacher, who was with us for two and one-half years. Thacher is head chemist and superintendent of tests for the Peerless Rubber Manufacturing Company, New Durham, N.J. He says he has a good job, and enjoys life generally.—Our old joker, Johnnie Thomas, officially known as Lieut. John Joseph Thomas, Coast Artillery Corps, U.S.A., was married on December 28 to Miss Lillian Elizabeth Koch, at Fort Monroe, Va. Lieutenant and Mrs. Thomas will be at home after January 3 at Fort Adams, Newport, R.I. Hearty congratulations to John.—Sidney Wells is at 17 Fairview Street, Roslindale, Mass.—Bob Thayer goes to New York January 1 to be on the editorial staff of the *Railway Age Gazette*. His specialty will be locomotives.

1908.

JOHN T. TOBIN, *Sec.*, care of F. F. Harrington, Bridge Engineer, Virginian Railway Company, Norfolk, Va.

RUDOLPH B. WEILER, *Res. Sec.*, 26 Brooks Street, Brighton, Mass.

I. *On the Part of the Resident Secretary*

The November bi-monthly dinner of the class was held at the Technology Club on the 8th, at 7 p. m. Twenty-one members were present, as follows: “Pop” Gerrish, who presided, L. H. Allen, W. E. Booth, B. W. Cary, C. W. Clark, Langdon Coffin, A. M. Cook, C. F. Joy, Jr., Hardy Cross, L. B. Ellis, F. L. Franks, W. F. Grimes, A. W. Heath, O. S. Lyon, S. C. Lyon, R. I. Ripley, Miles Sampson, E. J. Scott, E. R. Smith, F. T. Towle, C. W. Whitmore. F. L. Franks had just returned from the Philippines

where he had been on the Coast Survey. It was decided to try the experiment of having weekly dinners, held for the present on Wednesday at 1 p. m., at Crosby's on School Street. After the dinner most of the fellows attended a lecture on the "Panama Canal" by L. K. Rouke, '95, formerly assistant division engineer on the Canal, and now superintendent of streets for the city of Boston, which was being held at the Club that evening. The next dinner will take place January 10, 1911, same time and place.—Mr. and Mrs. George H. Pierce announce the birth of a son, Stanley Holt, on November 25. George is with the Metropolitan Elevated Railway Company, 139 Adams Street, Chicago, Ill.—The resident secretary will be pleased to receive addresses of the following, letters addressed to them having been returned:—M. L. Bodenstein, George R. Cooke, Miss Susie T. Folsom, John M. Hatton, Roy Hunter, John E. Johnson, Tsau Chi Lee, A. F. Mohan, U. J. Nicholas, Walter L. Pratt, Henry J. Ruggles.

II. *Matrimonial*

Harold Edwin True was married at Newburyport, Mass., Tuesday, November 15, to Miss Marion Pierce Safford of Newburyport.—The engagement is announced of Ralph J. Batchelder to Miss Laura B. Houtman.—William F. Dolke, Jr., was married on Monday, November 21, to Miss Gertrude Reynolds at Spokane, Wash. At home after January 1, South 1617 Grand Street, Spokane.

III. *New Addresses*

Alfred B. Babcock, 30 South Fourth Street, Brooklyn, N.Y.—A. T. Balkam, 78 Hutchings Street, Roxbury, Mass.—Paul B. Barrett, United Shoe Machinery Company, Montreal, P.Q., Canada.—Ralph J. Batchelder, 12 Humboldt Street, North Cambridge, Mass.—W. E. Booth, Foxboro, Mass.—John C. Brooks, Technology Chambers, Boston, Mass.—Clifford N. Cochrane, 134 Howard Street, Melrose, Mass.—Herbert A. Cole, Jr., New England Telegraph & Telephone Company, Fitchburg, Mass.—Alton M. Cook, 242 West Newton Street, Boston, Mass.—R. E. Drake, 24 Trinity Place, Boston, Mass.—N. LeRoy Hammond, Bristol, Conn.—Jacob A. Fottler, 62 Alden Street, Montello, Mass.—C. E. Hollender, care of North Texas Traction Company, Fort Worth, Texas.—G. T. Gambrell, P. O. Box 314, Ensley, Ala.—Warner H. Kiefaber, Central Supply Company, Indianapolis, Ind.—Prof. H. F. Kuehne, University of Texas, Austin, Texas.—Howard B. Luther, Sedanstrasse 411, Dresden, Germany.—D. B. Myers, 321 Story Building, Los Angeles, Cal.—W. H. Medlicott, 84 William Street, New York, N.Y.—Edward A. Plumer, American Telephone & Telegraph Company, 15 Dey Street, New York, N.Y.—Prof. A. N. Rebori, Art Institute,

Chicago, Ill.—Walter D. Reed, 512 Oakland Bank of Savings Building, Oakland, Cal.—Robert Robertson, Jr., South Hamilton, Mass.—Edward J. Scott, 580 Commonwealth Avenue, Boston, Mass.—Joseph H. Sinclair, 72 Lorimer Street, Rochester, N.Y.—Riggin Buckler, 11 Pleasant Street, Baltimore, Md.—Clarence W. Clark, 23 West First Street, South Boston, Mass.—W. I. Griffin, 13 West Street, Utica, N.Y.—Arthur C. Merrill, 109 Main Street, Peabody, Mass.—J. R. Nichols, 4 Highland Avenue, Haverhill, Mass.

1909.

CARL W. GRAM, *Sec.*, 1609 St. Louis Avenue, East St. Louis, Ill.

MAURICE R. SCHARFF, *Res. Sec.*, Mass. Inst. of Tech., Boston, Mass.

I

The resident secretary is arranging for a dinner to come off in January. Individual notices containing full particulars as to time, place, price, etc., will be sent to every member of the class, along with a request for annual dues, and for the latest information as to addresses, etc. Please prepare to be prompt in replying, not only to the questions, but also to the request for dues.—The men living near Boston are also requested to note the movement recently inaugurated by the younger class secretaries, to gather the local graduates of the classes between 1900 and 1910 for an occasional luncheon or smoker. Notices will be sent out as soon as plans mature, and it is hoped you will take advantage of this opportunity to renew acquaintance occasionally. Remember that you have to lunch somewhere, and whenever these gatherings come you will enjoy your lunch more if you join in.

II

Cupid continues his attacks on our ranks, as is shown by occasional rumors from the front. Paul Lord and Mex Weill are the latest freshmen in the matrimonial training school. Particulars below:—

From *Boston Journal*, November 17:

The marriage of Miss Emily Clark, daughter of Albert Earl Clark, and Paul Burton Lord, a graduate of Tech in the class of 1909, took place last night at the home of the bride, 20 Oakview Terrace, Jamaica Plain, the ceremony being performed by the Rev. Carol Perry of St. Peter's Episcopal Church. Four-year-old Shirley Blanchard, cousin of the bridegroom, was the flower girl, and the bride's sister, Miss Gladys Clark, the maid of honor. Henry F. Miller, 2d, M. I. T., acted as best man. Mr. and Mrs. Lord will make their home in Velardena, Mexico, after a short wedding trip.

Mr. Lord is a son of Mr. and Mrs. James Lord of 18 South Munroe Terrace, Pope's Hill, Dorchester, and a mining engineer.

From *San Francisco Call*, November 25:

The wedding of Miss Helen Loeb and Melville Weill Wednesday evening at the home of Mr. and Mrs. A. Weill in Clay Street was one of the prettiest affairs of the winter. The bride is a daughter of Mr. and Mrs. Jacob Loeb of the City of Mexico and her parents are among the most prominent residents of that city. She was educated in Europe and had the advantage of travel abroad. She was a visitor in this city last season, and was extensively entertained. Weill has many friends in this city but in recent years has been identified with mining affairs in the City of Mexico. He is a graduate of the Massachusetts Institute of Technology and is a son of A. Weill, president of the American Club in Mexico City. The bride is a cousin of Oscar S. Straus, ambassador to Turkey. The couple departed on a brief wedding journey and will return for a few days' visit here before going to their new home in Mexico.

And there are more coming. We don't hear of all of them, but the following rumor has reached us:—

From *Town Topics*, New York, November 3:

Mr. and Mrs. John W. Maillard have announced the engagement of their daughter, Anita Maillard, to Temple Bridgman, who is a mining engineer of promise, a graduate of Yale and of the Massachusetts Institute of Technology. It was during a trip in South America last year that she met Bridgman, who has been a recent guest at the Maillard home *en route* to Manila, where his profession has called him.

III

Probably no 1909 man has been so much in the public eye as Sam Perkins (V). He is a high-flyer of the first order, and all of his classmates will be interested in the reports below:—

From *Boston Globe*, October 22:

Samuel F. Perkins, aid in the German balloon *Dusseldorf II.* one of three missing starters in the international race, is a Dorchester man, who has had a long and varied experience in *aëronautics*. While a comparatively young man, he has long ranked as one of the foremost experts in *aëronautics* in America.

When a boy, attending the elementary schools, Mr. Perkins was a diligent student of kite-flying, and he is today perhaps better known as a manipulator of kites of all descriptions than as a balloonist.

After graduating from Mechanic Arts high school, he associated himself with Prof. A. Lawrence Rotch of Harvard, and H. H. Clayton at the Blue Hills Meteorological Observatory, and it was there that he gained his first important experience with kites. He later spent two years at the Massachusetts Institute of Technology, and he was an assistant to Capt. Thomas S. Baldwin in Washington when the latter sold the United States government its first dirigible balloon.

He is a member of the *Aëro Club* of America and the *Aëro Club* of New England and had charge of the kite-flying at the recent Harvard *aëro* meet at Atlantic, when he sent aloft several man-carrying kites, measuring eighteen feet in diameter.

Mr. Perkins' knowledge of the upper air currents has long been recognized and this secured for him the opportunity to become aid to Lieut. Hans Gericke, pilot of the *Dusseldorf II.*

Mr. Perkins had just returned from a kite-flying exhibit in the City of Mexico when the offer to accompany Pilot Gericke was received. Although having only forty-eight hours' notice, he eagerly accepted the invitation.

From *Boston Herald*, November 11:

Philadelphia, November 10.—Samuel F. Perkins of Boston made a record kite ascension within the city limits here today, being drawn more than forty feet into

the air by twelve kites. Perkins was swung over North Broad Street and across the tops of several buildings.

A permit had to be secured from the city authorities for the exhibition and Mr. Perkins secured the first permit ever issued by any city to fly man-carrying kites in the streets and over a city.

—Jack Elbert (X.) has been heard from. He writes from the University of Charlottenburg, at Berlin, "I have now started in with my university work here, and find what little I can understand very interesting. However, things are beginning to look a little brighter, and I have hopes."—Miss Longyear (IV.) wrote from Florence, Italy, in October, that she expects to be back in this country by Christmas, and adds the following notes: "I saw Fritz Kellogg, Simmons, and Louis Pitkin in Paris—all wedged in behind a table at the Café des Deux Magots. Paris certainly agrees with Fritz; he has the most becoming mustache, and is working as hard as—usual."—A. B. Morrill (XI.) is at the Sewage Experiment Station of the Sanitary District of Chicago, and sends in the following: "We are still in the sewage disposal investigation business and starting on another cold winter. I have been chief and entire force on some little sideline screening experiments the last few weeks. Now we are working on a report of progress, and I have been gathering rates and results of analyses and passing them on to the girl with the adding machine. Salmonde is with us shaking out suspended matter, dissolved oxygen, and oxygen consumed at a merry clip. And George F. Maglott, 1910, is protecting the plant from the winter's cold, its own infirmities, and the occasional solid-ivoryness of the filter attendants."—Stephenson (X.) is extending his sphere of usefulness at Rose Polytechnic Institute, and writes that he is now teaching organic chemistry, qualitative analysis, and gas analysis.

IV. *Changes of Addresses*

D. K. Bullens, Parish Manufacturing Co., Reading, Pa.—Charles L. Campbell, 228 Beale Street, Wollaston, Mass.—Kenneth E. Carpenter, 25 St. James Avenue, Boston, Mass.—Howard Congdon, care of Balcom & Darrow, 314 Madison Avenue, New York City.—Bradley Dewey, care of American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa.—J. J. Elbert, Kaiserdamm 113, Charlottenburg, Berlin, Germany.—George H. Gray, care of Telluride Power Co., Olmstead Provo, Utah.—Fred M. Green, care of The Adjutant-General, War Department, Washington, D.C.—Benjamin Hammond, 35 Court Street, Boston, Mass.—Calvin N. Harrub, Westfield, Mass.—Herbert L. Jenness, care of Boston & Northern Street Railway Company, 84 State Street, Boston, Mass.—Reginald L. Jones, 25 St. James Avenue, Boston, Mass.—Robert C. Kerr, 5215 Winthrop Avenue, Chicago, Ill.—Lester H. King, 13 Arnoldale Road,

Hartford, Conn.—Robert C. Latimer, 83 Newbury Street, Boston, Mass.—P. H. Mayer, 13 Central Park, West, New York City.—A. B. Morrill, 3932 Lake Avenue, Chicago, Ill.—Morse W. Rew, 849 Blue Hill Avenue, Boston, Mass.—Edward L. Ryerson, Jr., 38 Banks Street, Chicago, Ill.—Harold O. Stewart, Engineering Department, Rochester Railway and Lighting Company, Rochester, N.Y.—George E. Washburn, 36 Forest Street, Lexington, Mass.—John A. Willard, 1106 Hamilton Avenue, Trenton, N.J.—E. T. Williams, Imperial Maritime Custom, Nanking, China.—Claude T. Wilson, 134 Montague Street, Brooklyn, N.Y.—Philip E. Young, Maplevue Terrace, New Bedford, Mass.—Miss Helen M. Longyear, care of Richmond Hill House, New York City.—A. K. Mitchell, Ashcroft, British Columbia.—C. A. Johnson, 510 W. 184th Street, New York City.

1910.

JOHN M. FITZWATER, *Sec.*, 119 Henry Street, Brooklyn, N.Y.

G. BERGEN REYNOLDS, *Res. Sec.*, Southbridge, Mass.

Course I.—Harry O. Penland, S., 164 Howard Street, Spokane, Wash., is with his father John S. Penland, Union City, Ind.—M. E. Harris, 62 Lincoln Street, Lowell, Mass., is a law student at Boston University.—M. Alva Zook, 544 West Chestnut Street, Lancaster, Penn.—J. Evans James, Elverson, Chester County, Pa., is a draughtsman at the Baldwin Locomotive Works.—Elmer Jacobs, Mt. Carmel, Ill., care of Big Four Railroad, is with the C. C. C. and St. L. Ry.—Philip G. Laurson, 407 West Second Street, Elmira, N.Y., is with the American Bridge Company of New York.—Holman I. Pearl, 362 Longwood Avenue, Boston, Mass., is back at the Institute to complete his studies.—Malcolm B. Hall, Foxboro, Mass., is with the Standard Gauge Manufacturing Company.—Otto R. Rietschlin, call box 41, Massena, N.Y., is with the T. A. Gillespie Company of New York and Pittsburg. Rietschlin is working on the Souday dam and power house at Massena, N.Y., being built for the St. Lawrence Power Company.—Harold F. Parsons, 79 Mt. Pleasant Avenue, Gloucester, Mass., is with Barrows & Breed, 6 Beacon Street, Boston, Mass.—Thomas C. Quirk, 27 Quirk Street, Watertown, Mass., is treasurer of the firm Thomas Quirk & Son, contractors.—Austin B. Mason, Sumas, Wash., care of Stone & Webster, is working on the White River power development under the Pacific Coast Power Company.—Richard G. Tyler, 1510 West Avenue, Austin, Texas, is in the city engineering department. Tyler was married to Adelaide M. Tedford of Brookline, Mass., June 5, 1910.—Robert B. Alling, Riverside, Ill., is with the Shoshone Irrigation Survey, Wind River, Wyo.—H. D. G. Baxter, Timber, Ore., is with the P. R. & N. Co.—Rafael J. Torralbas, 640 J del

Monte, Havana, Cuba, is inspector of the sewerage system and paving contract of the city of Havana.—Kenneth Leavens, Box 307, Needles, Cal., is with the Atchison, Topeka & Santa Fé Railway Company. Leavens is transit man in charge of a maintenance party on the Arizona division, having 350 miles of main line to survey from Seligman, Ariz., to Bakersfield, Cal., and all of it desert.—S. Paul Vecker, 118 University Station, Yale University, New Haven, is a student at Sheffield Scientific School, class 1910.—Guy N. Harcourt, 60 Batavia Street, Boston, Mass., is at the Institute taking advanced work.—Paul R. Fleming, Natick, Mass., is with W. W. Wight, C. E., Wellesley Hills, Mass.—Guy H. Little, 52 The Albiston, Utica, N.Y., is with the Gunn Motor Company, Utica, N.Y.—Augustus B. Merry, Corzal, Canal Zone, Panama, is working at Pedro, Miguel, on the canal lock.—James G. Tripp, 221 Byrne Building, Los Angeles, Cal., is with the California Builders' Supply Company.—R. I. Ripley, 112 Cedar Street, Malden, Mass., is with the W. H. McElwain Company.—Otis S. Smith, Laconia, N.H., is with the town engineer of Westfield, Mass.—Harold Sharp, Georgetown, Cal., is with the Stone & Webster Engineering Corporation.—William E. Haugaard, Chestnut Street, Richmond Hill, N.Y., is studying abroad.—M. C. Halsey, Monrovia, Cal., is with Richard Neustadt Construction Company, Los Angeles, Cal.

Course II.—George H. Magee, 698 Salem Street, South Groveland, Mass., is with the Western Electric Company, Hawthorne, Ill. Magee is a student in the course of telephone emergency.—Atwood C. Page, Hartford, Conn., care of Security Company, has not entirely recovered his health, and is going South for the winter.—Jacob W. Purrinton, 430 Butler Exchange, Providence, R. I., is with C. R. Makepiece & Co., Mill, England.—C. F. Doble, 16 Maple Street, Hudson Falls, N.Y., is with the Union Bag and Paper Company.—Harold C. Brown, 104 Geneva Avenue, Dorchester, Mass., is at the Institute to complete his studies.—William H. Wengert, 200 Columbus Avenue, Boston, Mass., is taking Mr. Hiller's position as assistant in the Machine Design and Mill Engineering Department.—R. F. Hill, 56 Columbia Avenue, Westmount, P.Q., is with the Wire & Cable Company, Montreal.—H. G. Hawes, Jr., 60 Anderson Place, Buffalo, N.Y., is with C. R. Thomas Motor Company of that city.—O. C. F. Meisel, 10 Upland Avenue, Dorchester, Mass., is at the Institute to complete his studies.—Howard B. Richardson, 132 Tenth Street, Northeast, Washington, D.C., is in the Agricultural Department in the Bureau of Plant Industry.—Walter T. Spalding, 215 West Twenty-third Street, New York City, is terminal engineer of the Delaware, Lackawanna & Western Railroad.—H. S. Waite, 29 Commonwealth Avenue, Boston, Mass., is at the Institute to complete his studies.—Alfred Hague, 52 East Sixty-sixth Street, New York City.—James A. Cox, 32 Hemlock Street,

Roslindale, Mass., is with J. S. Cushing Company as secretary to the president.—W. H. Duffield, Hamilton, Ontario, care of John McPherson Company.—Tyler W. Carlisle, 336 Frankfort Avenue, Cleveland, Ohio, is with Strong, Carlisle & Hammond Co.

Course III.—Robert E. Anderson, 307 Broadway, Cincinnati, Ohio.—H. N. Crichton, Robinson, Col., is with the Wilson Mining Company.—Frederick A. Hurley, Stag Hall, Sparrows Point, Md., is with the Maryland Steel Company.—W. Burton Hargraves, 7 Eliot Place, Jamaica Plain, is private assistant to Professor Richards.—John M. Longyear, 253 College Avenue, Haughton, Mich., is a student at the Michigan College of Mines.—Chester J. Briggs, Santa Barbara, Chihuahua, Mexico, is with Minas Tecoletes y Anexas.—George M. Roads, Jr., Pottsville, Pa., is with the Philadelphia & Reading Coal and Iron Co.—Robert S. Breyer, Box 65, Y. M. C. A., Denver, Col., is with the American Smelting & Refining Co.—Lee Kalback, Oskaloosa, Iowa, is with the Kalback Lumber Company.—Robert F. Burnett, Myers Mine, Chisholm, Minn., is with the Oliver Iron Mining Company.—Benzo Katsura, Mineral and Metallurgical Department, Tokio, Imperial University, is at the Institute taking advanced work.

Course IV.—Charles C. Benton, Wilson, N.C.—James B. Noble, 3359 Wabash Avenue, Chicago, Ill., is with W. B. Hough Company.—Harry Trevithick, Refuge Cotton Oil Company, Vicksburg, Miss.—Harold E. Akerly, 13 Amherst Street, Rochester, N.Y., is with Westinghouse, Church, Kerr & Co.—Lewis J. Holliday, Laramie, Wyo., is with W. H. Holliday Company.—J. Theodore Whitney, 497 Main Street, Wakefield, Mass., is with Whidden & Co., general contractors and builders.—Kenneth E. Carpenter, 66 Westland Avenue, Boston, Mass.—Benjamin S. Hirschfeld, 1328 Hyde Street, San Francisco, Cal., is with Dakewell & Brown, architects.—Flora A. Johnson, Comstock, N.Y.—Philip A. Devlin, Turpentine Jasper Company, Texas, is with the Western Naval Stores Company.—Donald A. French, 172 Fairmount Avenue, Hyde Park, Mass., is with Joseph C. Schaeffler & Co., Boston.

Course V.—E. K. Jenckes, 624 Oak Street, Irwin, Pa., is with the Westmoreland Coal Company.—Harrison L. Clough, Merrimack, N.H., is with H. McElwain Company.—O. D. Evans, 55 Brooksdale Road, Brighton, Mass., is at the Institute taking graduate work.—Samuel Kostiuk, 34 Causeway Street, Boston, Mass.

Course VI.—Arthur L. Stein, 307 Madison Avenue, Scranton, Pa., is in the electrical department of the Lackawanna & Western Railroad Co.—Edward L. Howe, 613 Coal Street, Wilkesburg, Pa., is in the apprentice course of the Westinghouse Electric & Manufacturing Co.—R. W. Brush, 3 Durham Street, Boston, Mass., is with the Holtzer-Cabot Electric Company.—Charles M. Smith, Y. M. C. A. Building, Pittsfield, Mass., is with the General

Electric Company.—F. T. Crossley, 121 Beacon Street, Hyde Park, Mass., is with Stone & Webster.—Philip M. Wentworth, 1115 Mill Street, Reno, Nev., is with Stone & Webster.—William T. Biedler, 2802 North Calvert Street, Baltimore, Md., is with the Consolidated Gas, Electric Light & Power Co.—Ralph W. Perkins, Wenham, Mass., is with Ransome & Smith, concrete construction.—Frank A. Hayes, 272 Lafayette Avenue, Passaic, N.J., is with the Robins Conveying-Belt Company.—Allen A. Gould, Merrimack, N.H., is with W. H. McElwain Company.—George S. Humphreys, Provo, Utah, is with Telluride Power Company.—Horace V. S. Taylor, 613 Coal Street, Wilkinsburg, Pa., is an apprentice with the Westinghouse Electric & Manufacturing Co.—Elbert D. Green, Montreal, Canada, care of Allis-Chalmers-Bullock, Ltd.—William Horton, Jr., Provo, Utah, is with the Telluride Power Company.—Ralph H. Bowers, 832 Columbia Road, Dorchester, Mass.—Arthur L. Harding, Telluride Power Company, Telluride, Col., is with the Telluride Power Company.

Course VII.—Herbert O. Jenkins, 176 Cowper Street, Palo Alto, Cal.—William F. Wells, University of North Dakota, is in the Public Health Laboratory.—C. K. Blanchard, 554 Washington Street, Wellesley, Mass., is with the Wellesley Board of Health.—Karl J. Pomeroy, 97 Green Street, Melrose, Mass., is at the Institute.—Ruth O. Pierson, State House, Providence, R.I., is in the State Board of Health Department.—Horace S. Griswold, Department of Civil Engineering, University of California, Berkeley, Cal., is an instructor in civil engineering.—T. M. Hilliard, New York City College, New York, N.Y., is an assistant instructor.

Course IX.—K. D. Stellwagen, 265 Putman Street, Detroit, Mich.—Douglas C. McMurtrie, 480 Park Avenue, New York, is in the advertising and publishing business for himself.

Course X.—W. N. Drew, 201 Magnolia Street, Boston, Mass., is at the Institute to complete his studies.—James H. O'Brien, Fort Street, Detroit, Mich., is with W. C. Garregues, chemical engineers.—Karl W. Gasche, 112 Lafayette Avenue, Brooklyn, N.Y., is with the American Sugar Refining Company.—Charles E. Meulendyke, 404 Y. M. C. A., Kansas City, Mo., is with the United Zinc & Chemical Co.—Chester J. Randall, 248 Ash Street, Waltham, Mass., is back at the Institute as an assistant to Prof. A. H. Gill.—T. B. Whittemore, 583 Riverside Drive, New York, is with George A. Fuller Company, New York.

Course XI.—P. K. Brown, 44 Fenway, Boston, Mass., is at the Institute to complete his studies.—Henry J. Perry, 222 Morrison Avenue, West Somerville, Mass., is with Lawrence & Co., Boston, Mass.—Richard C. Jacobs, Jr., 215 Auburndale Avenue, Auburndale, Mass.—Ralph Kilscher, 269 St. Botolph Street, Boston, Mass., is with the Massachusetts State Board of Health.

Course XIII.—Leslie E. Geary, 1960 West Ninth Avenue, Seattle, Wash., is in business for himself.—Earl J. W. Ragsdale, Coast Artillery Corps, Fort Munroe, Va., is second lieutenant of the coast artillery.—John F. Malon, Jr., 169 College Street, Buffalo, N.Y., is with the Empire Shipbuilding Company.—French P. Sargeant, South Bethlehem, Pa., is with the Bethlehem Steel Company.

Course XIV.—Robert H. Lombard, Ashburnham, Mass.—The following notice taken from the Boston *Transcript* will be of interest to the class: The marriage of Miss Helen Hood Perley and C. Edward Tilton of Sutton, N.H., which took place at the home of the bride's parents, Mr. and Mrs. E. Horace Perley, Lakeside, Wakefield, was performed by Rev. Rufus S. Chase, rector of the Emmanuel Church in Wakefield. Miss Ruth Tilton, a sister of the bridegroom, was maid of honor and the bride's brother, Robert Perley, served as best man.